DOCUMENT RESUME

ED 271 968 FL 015 828

AUTHOR	Trites, Ronald L.; Moretti, Patricia
TITLE	Assessment of Readiness for Primary French Immersion. Grades Four and Five Follow-Up Assessment.
INSTITUTION	Ontario Dept. of Education, Toronto.
REPORT NO	ISBN-0-7729-1213-0
PUB DATE	86
NOTE	190p.; For grade one follow-up assessment, see ED 218 980.
AVAILABLE FROM	Ontario Institute for Studies in Education, 252 Bloor Street West, Toronto, Ontario M5S 1V6.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	*Academic Achievement; Academic Persistence; *Dropout Characteristics; Dropout Research; Followup Studies; Foreign Countries; *French; Grade 4; Grade 5; *Immersion Programs; Intermediate Grades; Kindergarten Children; *Learning Readiness; Primary Education; Second Language Programs; *Student Characteristics
IDENTIFIERS	Ontario

ABSTRACT

This study reports the follow-up assessments of fourth- and fifth-grade students who had participated in a French immersion program beginning in kindergarten, and of students in the same grades who had not participated in immersion programs. The study was designed to assess the predictive validity of the early identification battery used for four-year-olds and the follow-up kindergarten battery for five-year-olds, and to compare characteristics of the children who had dropped out of the immersion program with those of children who had remained in it as high or low achievers. Of the original 200 four-year-old kindergarten students participating in the study, 138 remained in 1982 and 119 in 1983, most of whom were in the French immersion program in grades four and five. Others were in one grade higher or lower, some in the English or intensive French program by transfer or from the outset, and some in the bilingual program by transfer or from the outset. Detailed information is presented in tabular form with narration on the children's enrollment and progress patterns, teachers' advice concerning enrollment in the programs, teacher ratings, academic difficulties and special help, problems reported by teachers and parents, parent attitudes, achievement levels, and the predictive validity of early assessment variables. A 9-page bibliography concludes the document. (MSE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED271968

Ministry
of
Education

ASSESSMENT OF READINESS FOR PRIMARY FRENCH IMMERSION

Grades Four and Five Follow-Up Assessment

French Immersion Series

RONALD L. TRITES, Principal Investigator
PATRICIA MORETTI

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

B Hildebrand

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

This research project was funded under contract by the Ministry of Education, Ontario.

This study reflects the views of the authors and not necessarily those of the Ministry of Education.

The Honourable Sean Conway, Minister

FL013828

© QUEEN'S PRINTER FOR ONTARIO, 1986

Order Information:

Publications Sales
The Ontario Institute
for Studies in Education
252 Bloor Street West
Toronto, Ontario M5S 1V6
Will invoice on orders over $30.00.
Other orders must be accompanied by a
cheque or money order payable to
O.I.S.E.

Publications Services
880 Bay Street, 5th Floor
Toronto, Ontario M7A 1N8

(416) 965-6015
(Toll Free) 1-800-268-7540
(Toll Free from area code 807)
Ask operator for Zenith 67200
Order must be accompanied by a cheque
or money order payable to the
Treasurer of Ontario

ONO 2665

Canadian Cataloguing in Publication Data

Trites, R. L. (Ronald Lou), 1936-
Assessment of readiness for primary French
immersion

(French immersion series)
Bibliography: p.
ISBN 0-7729-1213-0

1. Language acquisition. 2. Learning disabilities.
3. French language--Study and teaching as a
second language (Elementary)* I. Moretti, Patricia.
II. Ontario. Ministry of Education. III. Title.
IV. Series.

LB1139.L3.T74 1986 372.6'5'41 C86-099647-6

Appendices are available only on microfiche.

TABLE OF CONTENTS

PAGE

LIST OF TABLES v

ABSTRACT xi

ACKNOWLEDGMENTS xiii

INTRODUCTION 1
- Studies Reporting Success With Early Second-Language Immersion 1
- Studies Reporting Failures With Early Second-Language Immersion 3
- Variables Affecting Second-Language Learning 4
- Variables Affecting Success in French Immersion Programs 7
- Children With Learning Disabilities in French Immersion 8
- Second-Language Learning and Reading 9
- Specific Neurological Substrates of Language Learning 12

BACKGROUND AND AIMS 13
- French Immersion Programs in the Ottawa Area 13
- Findings of Previous Years of the Study 13
  - Learning Disabilities Found in Association with French Immersion Programming 13
  - Assessment of Readiness for Primary French Immersion 15
    - Four-Year-Old Kindergarten Early Identification Assessment (1977) 15
    - Five-Year-Old Kindergarten Follow-Up Assessment (1978) 16
    - Grade One Follow-Up Assessment (1979) 17
    - Grades Four and Five Follow-Up Assessment (1982, 1983) 17

THE SAMPLE 18
- History of the Sample 18
- Sample at 1983 Follow-Up Assessment 22

THE TEST BATTERIES 24
- Questionnaire Data 24
- Objective Tests 25
- Rating Scales 28

RESULTS 29
- 1983 Enrolment Groups 29
  - French Immersion Group 29
    - Low Achievers 29
    - High Achievers 29
  - Drop-Out Group 29
    - Early Drop-outs 30
    - Late Drop-outs 30
    - Non-Academic Drop-Outs 30
- French Immersion Group Versus Academic Drop-Outs 32
  - Descriptive Information 32
  - Biographical and Background Information Questionnaire 32
  - Teachers' Advice Regarding French Immersion Enrolment 34
    - Early Drop-Outs Versus French Immersion Success 37
    - Late Drop-Outs Versus French Immersion Success 37
    - All 34 Academic Drop-Outs Versus French Immersion Success 37
    - Conclusions Regarding Teachers' Advice 37
  - Teacher Ratings 42
    - Four-Year-Old Kindergarten Teacher Ratings 42
    - Five-Year-Old Kindergarten Teacher Ratings 50
    - Grade One Teacher Ratings 50
    - 1983 Teacher Ratings 51
  - Difficulty and Special Help in School 51
    - Difficulty in School 51
    - Special Help in School 55
  - Connors Teacher Ratings 60
  - Problem Areas Reported by Teachers and Parents 60
    - Early Drop-Outs 60
    - Late Drop-Outs 63
    - French Immersion Success 63

Parents' Original Reasons for Enrolling Children in French Immersion 63
Parent Questionnaire 64
French Immersion Subjects 64
Drop-Outs 69
Parents' Concerns About the French Immersion Program 69
Connors' Parent Ratings 69
Repeating Grades and French Immersion 70
Subject Questions 73
Responses to Subject Questionnaire 75
Subjects' Suggestions for Improving the French Immersion Program 77
Children's Personality Questionnaire 80
Observer Checklist 81
T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, Grade One, Grade Four, and Grade Five Variables 81
Early Drop-Outs Versus Late Drop-Outs 88
T-Test Comparisons of Early and Late Drop-Outs on the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, Grade One, Grade Four, and Grade Five Variables 88
Parents' Reasons for Withdrawing Their Child From French Immersion 91
Drop-Outs Versus Low Achievers and High Achievers 94
Descriptive Information 94
Biographical and Background Information Questionnaire 96
Parents' Original Reasons for Enrolling Their Child in French Immersion 96
Teachers' Advice Regarding French Immersion Enrolment 100
Teacher Ratings 100
Four-Year-Old Kindergarten Teacher Ratings 102
Five-Year-Old Kindergarten Teacher Ratings 102
Grade One Teacher Ratings 105
Difficulty and Special Help in School 107
1983 Drop-Outs Versus Low and High Achievers 110
Tactual Performance Test 112
French Immersion Subjects Versus Drop-Outs 112
Early Drop-Outs, Low Achievers, and High Achievers 112
Late Drop-Outs, Low Achievers, and High Achievers 112
1983 Drop-Outs, Low Achievers, and High Achievers 116
Discriminant Function Analyses 116
Early Identification Assessment Battery Predictor Variables 118
French Immersion Success vs. All Academic Drop-Outs 119
Early Drop-Outs vs. Early Low Achievers and Early High Achievers 126
Late Drop-outs vs. Late Low Achievers and Late High Achievers 132
Five-Year-Old Kindergarten Follow-Up Assessment Battery Predictor Variables 141
French Immersion Success vs. All Academic Drop-Outs 141
Early Drop Outs vs. Early Low Achievers and Early High Achievers 145
Late Drop-Outs vs. Late Low Achievers and Late High Achievers 151
Follow-Up Testing of Subjects From 1974-1975 Studies 159
Introduction 159
The Sample 159
T-Test Comparisons Between Drop Outs and French Immersion Success Subjects 160

DISCUSSION 162

BIBLIOGRAPHY 167

APPENDICES ARE AVAILABLE ONLY ON MICROFICHE

LIST OF TABLES

TABLE		PAGE
1	School Programs of Children Traced From 1978 to 1979	19
2	School Programs of Children Traced From 1979 to 1982	20
3	School Programs of Children Traced From 1982 to 1983	21
4	Summary of School Programs in the Spring of 1983	23
5	Number of Months Spent in the French Immersion Program	31
6	Sex and Hand Dominance Comparisons of French Immersion Subjects and Drop-Outs	33
7	Age, Verbal IQ, Performance IQ, Full Scale IQ, and Socioeconomic Status Comparisons of French Immersion Subjects and Drop-Outs ...	33
8	Chi-Square Analyses Comparing the French Immersion Subjects and Drop-Outs in Terms of Whether or Not Mother Had Taken A Post-secondary Course in French, the Number of Books in the Home, and Nursery School Attendance	35
9	Chi-Square Analyses Comparing the French Immersion Subjects and Early Drop-Outs in Terms of Four- and Five-Year-Old Kindergarten Teachers' Advice Regarding French Immersion Enrolment	36
10	Chi-Square Analyses Comparing the French Immersion Subjects and Late-Drop Outs in Terms of Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade One Teachers' Advice Regarding French Immersion Enrolment	39
11	Chi-Square Analyses Comparing the French Immersion Subjects and All Academic Drop-Outs in Terms of Four-Year-Old Kindergarten, and Five-Year-Old Kindergarten Teachers' Advice Regarding French Immersion Enrolment	41
12	Chi-Square Analyses Comparing French Immersion Subjects and All Academic Drop-Outs in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation ..	43
13	Chi-Square Analyses Comparing French Immersion Subjects and Early Drop-Outs in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation	44
14	Chi-Square Analyses Comparing French Immersion Subjects and Late-Drop Outs in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation	45
15	Chi-Square Analyses Comparing French Immersion Subjects and All Academic Drop-Outs in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level	46
16	Chi-Square Analyses Comparing French Immersion Subjects and Early Drop-Outs in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level	47
17	Chi-Square Analyses Comparing French Immersion Subjects and Late Drop-Outs in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level	48

TABLE		PAGE
18	Chi-Square Analyses Comparing French Immersion Subjects and Late Academic Drop-Outs in Terms of Grade One Teacher Ratings of Comprehension of French, French Oral Skills, Reading Skills in French, Confidence and Willingness in French, and Present Functioning Level	49
19	Chi-Square Analyses Comparing French Immersion Subjects and 1983 Drop-Outs in Terms of Grade Five Teacher Ratings of Comprehension of English, Oral Skills in English, Reading Skills in English, Spelling Skills in English, Willingness and Confidence in English, Arithmetic Skills and Functioning Level	52
20	Chi-Square Analyses Comparing the French Immersion Subjects with Early Drop-Outs, Late Drop-Outs and All Drop-Outs Combined and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Difficulty in Four-Year-Old Kindergarten as Reported by Teachers	54
21	Chi-Square Analyses Comparing French Immersion Subjects With Early Drop-Outs, Late Drop-Outs, and All Drop-Outs Combined and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Difficulty in Five-Year-Old Kindergarten as Reported by Teachers	56
22	Chi-Square Analyses Comparing French Immersion Subjects with Early Drop-Outs, Late Drop-Outs and All Drop-Outs Combined and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Difficulty in Grade One as Reported by Teachers	57
23	Chi-Square Analyses Comparing French Immersion Subjects With Early Drop-Outs, Late Drop-Outs, and All Drop-Outs Combined and Comparing Early Drop-Outs With Late Drop-Outs in Terms of Special Help Received in Five-Year-Old Kindergarten as Reported by Teachers	58
24	Chi-Square Analyses Comparing French Immersion Subjects With Early Drop-Outs, Late Drop-Outs and All Drop-Outs Combined and Comparing Early Drop Outs With Late Drop Outs in Terms of Special Help Received in Grade One as Reported by Teachers	59
25	Areas in Which French Immersion Subjects and Drop-Outs Were Experiencing Difficulty at the 1983 Testing as Reported by French Immersion Teachers, English Teachers, and Parents	61
26	Frequency of Occurrence of 11 Categories of Parents' Original Reasons for Enrolling Children in French Immersion for the French Immersion and Drop-Out Groups	65
27	Parents' Responses to the Parent Questionnaire for the French Immersion and Drop-Out Groups	67
28	Concerns About the French Immersion Program Reported by Parents of Children in the French Immersion and Drop-Out Groups	71
29	Responses to the 1983 Subject Questionnaire for French Immersion Subjects and Drop-Outs	74
30	Suggestions for Improving the French Immersion Program Given by French Immersion Subjects and Drop-Outs	78
31	Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop Outs on the Four-Year-Old Kindergarten Variables	82

TABLE		PAGE
32	Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Grade One Variables	84
33	Means, Standard Deviation, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Grade One Variables	85
34	Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Grade Four Variables	86
35	Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Grade Five Variables	87
36	Means, Standard Deviations, and Significant T-Test Comparisons of Early and Late Drop-Outs on the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, Grade One, Grade Four, and Grade Five Variables	89
37	Parents' Reasons for Withdrawing Children From the French Immersion Program	92
38	Sex and Handedness Comparisons of Drop-Outs, Low Achievers, and High Achievers	95
39	Age, Verbal IQ, Performance IQ, Full Scale IQ, and Socioeconomic Status Comparisons of Drop-Outs, Low Achievers, and High Achievers	95
40	Chi-Square Comparisons of Drop-Outs, Low Achievers, and High Achievers in Terms of Whether or Not Mother Had Taken a Post-secondary Course in French	97
41	Frequency of Occurrence of 11 Categories of Reasons Given by Parents of Drop-Outs, Low and High Achievers for Enrolling Their Child in French Immersion	98
42	Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade One Teachers' Advice Regarding French Immersion Enrolment	101
43	Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation	103
44	Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level	104
45	Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Grade One Teacher Ratings of Comprehension of French, French Oral Skills, Reading Skills in French, Confidence and Willingness in French, and Functioning Level	106
46	Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Difficulty in School as Reported by Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade One Teachers	108

TABLE		PAGE
47	Chi-Square Analyses Comparing Drop Outs, Low Achievers, and High Achievers in Terms of Special Help Received in School as Reported by Five-Year-Old Kindergarten and Grade One Teachers	109
48	Means, Standard Deviations, and Results of Significant F-Tests Comparing 1983 Drop-Outs, Low Achievers, and High Achievers on the 1983 Variables	111
49	T-Test Comparisons Between French Immersion Subjects and Drop-Outs at the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade Five Testings on the Tactual Performance Test Scores	113
50	F-Ratio Comparisons Among Early Drop-Outs, Low Achievers, and High Achievers on the Four-Year-Old and Five-Year-Old Kindergarten Tactual Performance Test Scores	114
51	F-Ratio Comparisons Among Late Drop-Outs, Low Achievers, and High Achievers on the Four-Year-Old and Five-Year-Old Kindergarten Tactual Performance Test Scores	115
52	F-Ratio Comparisons Among 1983 Drop-Outs, Low Achievers, and High Achievers on the Four-Year-Old and Five-Year-Old Kindergarten Tactual Performance Test Scores	117
53	Means, Standard Deviations, and F-Ratios for French Immersion Subjects Versus all Academic Drop-Outs on the 24 Selected Predictor Variables from the Early Identification (Four-Year-Old Kindergarten) Assessment Battery	120
54	Standardized Discrimination Function Coefficients for the Variables From the Early Identification Assessment Battery Entering Into the Discriminant Function for French Immersion Subjects and All Academic Drop-Outs	123
55	Results of the Classification of French Immersion Subjects and All Academic Drop-Outs Using the Discriminant Function Computed with Variables from the Early Identification Assessment Battery	125
56	Means, Standard Deviations, and F-Ratios For Early Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Predictor Variables from the Early Identification Assessment Battery	127
57	Standardized Discriminant Function Coefficients for the Variables from the Early Identification Assessment Battery Entering Into the 2 Discriminant Functions for Early Drop-Outs, Low Achievers, and High Achievers	130
58	Group Centroids for the Early Drop-Outs, Low Achievers, and High Achievers on the 2 Discriminant Functions Computed Using Variables from the Early Identification Assessment Battery	131
59	F-Ratios Between the Pairs of Groups for the Early Drop-Outs, Low Achievers, and High Achievers (Early Identification Assessment Battery Discriminant Functions)	131
60	Results of the Classification of Early Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables From the Early Identification Assessment Battery	134

TABLE		PAGE
61	Means, Standard Deviations, and F-Ratios For Late Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Predictor Variables From the Early Identification Assessment Battery	135
62	Standardized Discriminant Function Coefficients for the Variables From the Early Identification Assessment Battery Entering Into the 2 Discriminant Functions for Late Drop-Outs, Low Achievers, and High Achievers	137
63	Group Centroids for the Late Drop-Outs, Low Achievers, and High Achievers on the 2 Discriminant Functions Computed Using Variables From the Early Identification Assessment Battery	138
64	F-Ratios Between the Pairs of Groups for the Late Drop-Outs, Low Achievers, and High Achievers (Early Identification Assessment Battery Discriminant Functions)	138
65	Results of the Classification of Late Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables from the Early Identification Assessment Battery	140
66	Means, Standard Deviations, and F-Ratios for French Immersion Subjects Versus All Academic Drop-Outs on the 22 Selected Predictor Variables from the Kindergarten Follow-up Assessment Battery (Five-Year-Old Kindergarten Battery)	142
67	Standardized Discriminant Function Coefficients for the Variables from the Kindergarten Follow-up Assessment Battery Entering Into the Discriminant Function for French Immersion Subjects and All Academic Drop-Outs	144
68	Results of the Classification of French Immersion Subjects and All Academic Drop-Outs Using the Discriminant Functions Computed with Variables from the Kindergarten Follow-Up Assessment Battery	146
69	Means, Standard Deviations, and F-Ratios for Early Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Predictor Variables from the Kindergarten Follow-up Assessment Battery ...	147
70	Standardized Discriminant Function Coefficients for the Variables From the Kindergarten Follow-Up Assessment Battery Entering Into the 2 Discriminant Functions for Early Drop-Outs, Low Achievers, and High Achievers	149
71	Group Centroids for the Early Drop-Outs, Low Achievers, and High Achievers on the 2 Discriminant Functions Computed Using Variables from the Kindergarten Follow-Up Assessment Battery ...	150
72	F-Ratios Between the Pairs of Groups for the Early Drop-Outs, Low Achievers, and High Achievers (Kindergarten Follow-Up Assessment Battery Discriminant Functions)	150
73	Results of the Classification of Early Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables from the Kindergarten Follow-Up Assessment Battery	153
74	Means, Standard Deviations, and F-Ratios for Late Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Variables From the Kindergarten Follow-Up Assessment Battery	154
75	Standardized Discriminant Function Coefficients for the Variables from the Kindergarten Follow-Up Assessment Battery Entering Into the 2 Discriminant Functions for Late Drop-Outs, Low Achievers, and High Achievers	155

TABLE		PAGE
76	Group Centroids for the Late Drop-Outs, Low Achievers and High Achievers on the 2 Discriminant Functions Computed Using Variables from the Kindergarten Follow-Up Assessment Battery ...	156
77	F-Ratios Between the Pairs of Groups for the Late Drop-Outs, Low Achievers, and High Achievers (Kindergarten-Follow-Up Assessment Battery Discriminant Functions)	156
78	Results of the Classification of Late Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables from the Kindergarten Follow-Up Assessment Battery	158
79	T-Test Comparisons Between Drop-Outs and French Immersion Success Subjects on The 1983 Test Variables	161

ABSTRACT

Two years of studying the characteristics of children who experience difficulty in primary French immersion programs has provided evidence that the type of learning difficulty experienced by this group is unique when compared with "traditional" learning disability groups such as children with primary reading disability, hyperactivity, minimal cerebral dysfunction, and primary emotional problems. The pattern of neuropsychological deficits in the French immersion learning-difficulty group suggested a mild maturational lag in the temporal lobe regions of the brain. Follow-up studies indicated that this lag is resolved by about nine to ten years of age.

Since it was possible to identify the characteristics of children who experience learning problems in primary French immersion programs through test scores, a test battery was designed to detect the likelihood of success in primary French immersion based on scores obtained at age four, prior to entry into such a program.

A prospective seven-year early identification project based on a large random sample of children scheduled to enter primary French immersion was conducted in the Ottawa Board of Education. A combination of biographical and family background factors, teacher ratings, and psychological assessment was obtained on 200 children at the end of four-year-old Kindergarten and prior to their entry into five-year-old primary French immersion Kindergarten. The children were assessed again at the end of five-year-old Kindergarten, the end of Grade one, Grade four, and Grade five. It was possible to maintain contact with a total of 60% of the children throughout the seven years of the study. The children who entered primary French immersion in the Ottawa Board of Education were compared with children entering English programs and were found to represent a select group: they came from higher socioeconomic levels; were read to more frequently at home; had parents who were either French-speaking or expressed an interest in learning French; and had more nursery school experience. The teachers rated these children higher in terms of ability, social maturation, and motivation. The testing at the end of four-year-old Kindergarten indicated that this group was of bright-normal intelligence, precocious in the development of English vocabulary skills, and accelerated in the development of academic achievement skills in areas of reading, spelling, and arithmetic.

The results of the long-term study indicated that 20% of the French immersion group dropped out for academic reasons usually in five-year-old Kindergarten and Grade one. A further 20% remained in the program in spite of experiencing considerable difficulty. Teacher ratings at the end of four-year-old Kindergarten and at the end of five-year-old Kindergarten were not reliable predictors of learning-difficulty drop-outs. Three-quarters of the children with specific learning difficulties in primary French immersion had clear evidence of problems on the test battery at both the five-year-old Kindergarten and Grade one testings. Children who dropped out of the primary French immersion program progressed well once integrated into the English program. Thus their learning difficulty was specific to the second language learning situation.

It was possible to predict with over 80% accuracy the future progress of children in primary French immersion (i.e. whether the children would drop out of the program because of learning difficulties or, if they remained in the program, would be a high achiever or a low achiever) based on the four-year-old Kindergarten assessment. Equally accurate predictions of long-term success or difficulty could be made on the basis of the five-year-old Kindergarten assessment.

Children who dropped out of the early French immersion program did not opt for a late immersion program in spite of the fact that they were doing well in school. Their primary reasons for avoiding this option were lack of confidence in their ability to speak French and negative attitudes toward the French immersion program. This argues strongly for the importance of a reliable early identification assessment.

ACKNOWLEDGEMENTS

We would like to express our appreciation to the principals and teachers of the Ottawa Board of Education who cooperated in this investigation, to the parents and children who were involved, and to the research assistants who gathered information and tested the children.

This research was made possible through the financial support of the Ontario Ministry of Education and its assistance is gratefully acknowledged.

INTRODUCTION

In many Canadian provinces, several options for the teaching of French to English-speaking children have been developed over the past fifteen years. One option is the early French immersion program in which English-speaking children are exposed to French as the language of instruction for at least 50% of the school day beginning in the primary grades. In most school systems, Kindergarten and Grade one are taught exclusively in French with English language instruction being introduced and gradually increased in later grades.

At present there is contradictory evidence regarding the success of early immersion programming as a means of acquiring proficiency in a second language without producing detrimental effects on native-language skills. Studies describing a favourable outcome of immersion programming will be discussed below, followed by research outlining negative aspects of such programming.

STUDIES REPORTING SUCCESS WITH EARLY SECOND-LANGUAGE IMMERSION

One study supporting a favourable outcome of immersion programming was conducted in the St. Lambert area of Montreal, Canada. Lambert and Tucker (1972) described the linguistic, intellectual, and attitudinal development of English-speaking children in French immersion from Kindergarten through Grade four compared to English-speaking children in regular English classes and French-speaking children in regular French classes. In general, the results of this investigation indicated that French immersion programming results in satisfactory proficiency in the French language for English-speaking children, without detrimental effects either to English language skills or to progress in other academic areas. However, the experimental nature of this program, as well as the possible selectivity of the children (i.e., only the most capable children from an upper-middle class area were in French immersion classes), along with tremendous parental involvement and commitment to this program, may have contributed to its substantial reported success.

Further investigations which followed the children in the St. Lambert French immersion program through Grade five (Lambert, Tucker and D'Anglejan, 1973), Grade six (Bruck, Lambert and Tucker, 1976), Grade seven (Bruck, Lambert and Tucker, 1974) and Grade eight (Bruck, Lambert and Tucker, 1974) corroborated the success of French immersion programming in those schools. In addition, the results of a preliminary study of children from working class, English-speaking homes who participated in a French immersion program in Kindergarten and Grade one suggested that the program was also suitable for that sample of children (Tucker, Lambert and D'Anglejan, 1972).

Another group of studies (Barik and Swain, 1974, 1975a, 1975b, 1976a, 1976b), compared samples of children in French immersion classes and regular English classes on measures of intelligence, achievement in reading and arithmetic, and French comprehension. Attempts were made to follow the same children from Kindergarten through Grade three, but the samples differed at each grade level. Results indicated that French immersion programming did not have negative effects upon cognitive development. English language skills lagged slightly in Grade

one for French immersion children, but this was overcome in Grade two, with the exception of spelling skills in some samples, after English Language Arts Skills had been introduced. These results supported the general success of French immersion programming. However, children with hearing, perceptual or related problems were excluded from the testing and no information was provided regarding drop-outs from French immersion or children who did not do well in the program. In addition, the IQ level of children in French immersion in Grades two and three was significantly higher than it was in Grade one suggesting that the children with lower IQ's had dropped out.

Edwards and Casserly (1971, 1972, 1973) compared samples of children in French immersion programs with children in the English program who were instructed in French for seventy-five minutes per day. These children were compared from Grades one through three on measures of personality, achievement in arithmetic, language skills in English and French, visual, auditory, and kinesthetic functioning, psycholinguistic abilities, and intelligence. The children in French immersion did as well as the children in the English program in all areas, with the exception of a lag in their English language skills in Grade two, which was overcome in Grade three after the introduction of English language arts. The French immersion children showed greater progress in French as compared to the group instructed in French for seventy-five minutes per day. In summary, the results of this study supported intensive second-language training.

However, it was noted that children with intellectual, learning, language, or environmental handicaps were encouraged to remain in the seventy-five minute program, suggesting that preselection factors might have favoured the French immersion sample.

Genesee (1978) evaluated children in an early immersion program in the Protestant School Board of Greater Montreal. The children were followed from Grade one through Grade six and were compared with children in the regular English program and to Francophones in regular French schools. Children in the French immersion program lagged in the development of English language skills until the introduction of English language arts. However, they continued to have difficulty with English spelling until the Grade five level. Students with below-average ability had lower achievement levels than their academically stronger peers in French immersion. However, their level of achievement in English was comparable to that of students of below-average ability in the English program.

Despite the successful outcomes reported by the above studies, these results must be viewed with caution. Although it is clear that there was some degree of attrition in the number of children who continued in the French immersion program, very rarely did these studies include a definite statement as to either the number or percentage of children who dropped out of the program, or to their reasons for dropping out of the program. In the St. Lambert area of Montreal, 20 of the original 26 children in the pilot French immersion class were still in the program by Grade five (Lambert et al., 1973) and only 15 by Grade seven (Bruck, Lambert, and Tucker, 1976). Of the 38 children in the French immersion follow-up class, 30 were still in the program by Grade four (Lambert et al., 1973) and only 25 by Grade six (Bruck et al., 1976). However, their reasons for dropping out were not mentioned.

The above studies also did not consider the children who had difficulty in French immersion programs. Also, there was a tendency towards selectivity in the choice of subjects. Edwards and Casserly (1973) suggested the possibility that preselection factors favoured the French immersion sample. Barik and Swain (1974) eliminated certain children from their analysis, such as "pupils whose teachers indicated [that they] had special problems (for example, serious hearing or vision difficulties, emotional problems); pupils whose teachers indicated they had a very limited ability to understand and express themselves in English."

Clearly, there are important unresolved questions regarding the outcome of French immersion programs in Canada. The favourable results reported may be based in part on biased samples. Little is known about the failures or of the children who experience difficulty in the immersion programs. It is important that efforts be made to define the characteristics of the marginally successful and failing students as well as the successful ones.

STUDIES REPORTING FAILURES WITH EARLY SECOND-LANGUAGE IMMERSION

The studies mentioned above are unique in view of the fact that early immersion programming has not met with success in several countries. In Ireland, English-speaking children, for whom the language of instruction in school was Irish, did not achieve the same standard in written English as English monolinguals, or in written Irish as Irish monolinguals. The Irish immersion children also experienced retardation in problem-solving arithmetic but not in simple arithmetic computations (Macnamara, 1966).

Jones (1966) reported that English-speaking children taught in Welsh were below English monolinguals in English reading. A slight positive correlation was found between favourable attitudes toward learning Welsh and Welsh language achievement. Conversely, if the parents' attitudes towards learning Welsh were negative, the children did poorly in this program.

In South Africa, it was observed that bilingual children taught in their mother tongue showed no adverse emotional reactions, but if children of lower intelligence were taught in the language with which they were less familiar, emotional disturbances could result (UNESCO Report, 1975).

Modiano (1968) found that when children in Mexico whose native tongue was Tzeltal or Tzotzil were given reading instruction in Spanish only, they scored significantly lower on Spanish reading tests than children who were taught to read in their native tongue first and in Spanish later.

In the United States, there has been much attention directed towards the progress of Spanish-speaking children attending English language schools. In general, children in this English immersion program have not achieved competence in the English language comparable to that of English monolinguals, and have had poor academic success (Macnamara, 1966; Gezi, 1974; Ortiz, 1982). In response to the failure of this immersion approach, bilingual education programs have been set up in which instruction begins in the vernacular moving gradually

towards English. Improved academic success is observed among children in programs which offer instruction in their mother tongue (Gezi, 1974).

Engle (1975) reviewed twenty-four reports concerned with the use of the vernacular language in education. She raised two questions: "Will a child learn to read more rapidly in his second language if he is first taught to read in his primary language?" and "Will the child achieve greater general knowledge of other subject matters if he is taught these subjects first in his native language?" Engle concluded that no definitive answers to these questions could be drawn since the reports varied in many ways and there were many confounding factors.

VARIABLES AFFECTING SECOND-LANGUAGE LEARNING

Regardless of the manner in which a second language is introduced, considerable interest has been shown in individual differences in second-language acquisition. Two factors frequently cited as important determinants of success in second-language learning are linguistic aptitude, and attitudinal variables (Barkman, 1969; Jones, 1966; Gardner and Lambert, 1959; Pimsleur, Stockwell and Comrey, 1962; Stern, 1967; Mackey, 1967). Little is known about differences in language aptitude among children below age nine or ten; however, after these ages there is clear evidence that children vary in aptitude for foreign language learning (Carroll, 1969).

Level of biological maturation has been stressed by some as an important determinant of success in second-language learning. Penfield (1953, 1965) was an influential figure in promoting the view that young children are the best language learners. He stressed that speaking, understanding speech, reading, and writing depend on certain specialized areas of the cerebrum, and that there is an optimum age when these areas are plastic and receptive. In his view, functional localization of skills is established by ages ten to fourteen, so that specific areas of the cortex become fixed as the speech cortex. Penfield (1965) held that second-language teaching, using the "mother's method" of direct language teaching should begin before the age of six or eight so that the child's brain will be conditioned early, thus making him or her a better linguist. Much of this theory was based on clinical evidence that, after damage to the dominant hemisphere, children below age ten or twelve recovered speech functions, some by establishing a speech centre in adjacent areas of the cortex or even in the previously non-dominant hemisphere.

Lennenberg (1967) has also promoted this view by suggesting that there is a critical period for language acquisition which ends at puberty. This cutoff point is marked by a loss of cerebral plasticity, thought to be caused by the completion of the development of cerebral dominance, or lateralization of language function. Lennenberg supported his lateralization-by-puberty hypothesis by citing evidence that right-hemisphere injuries cause more language disturbance in children than in adults, indicating greater right-hemispheric involvement in language functions during childhood. In addition, the transfer of language function to the minor hemisphere after injury to the dominant hemisphere was reported to occur only before puberty. There is, of course, abundant evidence to argue against this (e.g.,

Bramwell, 1898). According to Lennenberg, such transfer was seen to be related to incomplete lateralization, since it utilized the linguistic capacities of the right hemisphere, which have not fully lateralized to the left hemisphere.

The conclusions of Penfield and Lennenberg, however, have been challenged. McLaughlin (1977) provides an excellent review of issues related to second-language learning in children. He points out that, contrary to popular belief, "older children do better on almost all aspects of language acquisition than do younger children in comparable circumstances." Phonological aspects are a possible exception, with younger children having less difficulty than older ones in acquiring native-like pronunciation. Lennenberg's critical-period hypothesis is thus shown to be doubtful.

Krashen (1973, 1975) also challenged the relationship between lateralization and a critical period for language acquisition. He suggested that the development of language is complete before puberty, perhaps at age five. He reviewed Lennenberg's data of 1967 and pointed out that the injuries cited in support of lateralization-by-puberty occurred before age five and could be used to support the lateralization-by-five hypothesis. Some testing data, including dichotic-listening test results, were cited in support of this earlier age level. Krashen claimed that completion of lateralization does not pose an absolute barrier to language acquisition, and, in fact, evidence suggests that lateralization may even be established at birth (Molfese, 1974). Thus, cerebral dominance is not responsible for the critical period of language acquisition. However, lateralization may be implicated since language learning may depend on the previous maturation and lateralization of certain mental abilities localized in the left hemisphere.

Age changes in language-learning ability have been related to cognitive development. Tremaine (1975) found that children aged seven to ten in a French immersion program showed a dramatic improvement in their comprehension of both French and English syntax once they had reached Piaget's stage of concrete operations (age seven or eight to eleven or twelve). It was suggested that comprehension of English and French requires the same abilities needed for certain types of concrete operational thought. In addition, children in French immersion comprehended English syntax significantly better than did children receiving seventy-five minutes of instruction in French daily. It was proposed that intensive exposure to French facilitated comprehension of English syntax because the same maturational abilities were involved. This facilitation was possible because the children were in an intermediate stage in which concrete operations and, presumably, syntactic comprehension were trainable.

Rosansky (1975) examined possible cognitive factors related to a critical period for the acquisition of language. The onset of Piaget's stage of formal operations was seen as "the beginning of the end" of the critical period for first-or second-language acquisition. Formal operations are established at about age fourteen or fifteen, corresponding to the age at which second-language learning is reported to be difficult and usually incomplete. Rosansky suggested that the awareness of differences, which characterizes the stage of formal operations, may be a block to second-language acquisition. The child learns language along with other symbolic functions beginning in the sensory-motor period. During the stage of

concrete operations, comprehension of the logic of classes and relations characterizes cognitive structures. During this stage, the child is limited to focusing on the underlying similarities of languages. In terms of this view, once the stage of formal operations is established, the student's awareness of differences and all possibilities requires that language learning be accomplished by a different route than that followed previously. At this level, instruction in the abstracted aspects of language of which the adult is aware becomes the likely route for second-language acquisition.

These investigations of language learning in relation to cognitive development are potentially important. However, as yet the available evidence is tentative.

As mentioned earlier, many disagree that adults lose an innate capacity for language learning or that they are less well-equipped cognitively than children for second-language learning. Schumann (1975) suggested that affective variables are more important than biological maturation in problems associated with adult second-language learning. Social and psychological changes at puberty may interfere with second-language learning (e.g., students at this stage may associate "different" with "bad", or may be unwilling to internalize new norms). If affective variables such as attitude, motivation, and empathy are positive, cognitive processes are allowed to work and second-language learning is successful. Smythe, Stennet, and Gardner (1976) listed children's lack of self-consciousness, lack of fixed patterns, additional time in second-language learning, and motivation as factors facilitating their second-language learning. They denied the superiority of children as foreign-language learners. Burstall, Jamieson, Cohen and Hargreaves (1974) found that older children (age eleven) tended to learn French more efficiently than younger ones (age eight) when it was taught for a short daily period. They noted that some able students found learning French difficult because they found the emphasis on oral learning without the support of visual cues intolerable. Preference for the auditory rather than the visual mode may be related to second-language learning. Catford (1971) cited different circumstances (e.g., occupational pressures, time constraints), rather than the loss of an innate capacity, as accounting for adults' less-successful language learning. Macnamara (1975) views first- and second-language acquisition as the same process and cites evidence from studies to show that adults are better than children in some aspects of second-language learning.

Favourable attitudes towards the second language and the second-language community seem to facilitate second-language learning (Mackey, 1967; Jones, 1966; Gardner and Smythe, 1973). Secondary school students whose aim in second-language learning is integrative (i.e., who wish to learn a second language in order to interact with, communicate with, and become a part of the second-language community) are reportedly more successful in learning the second language than students whose aims are utilitarian or instrumental, for example, to increase employment opportunities (Gardner and Lambert, 1959; Lambert, 1974). In addition, the latter group tended to drop out of secondary school French courses more often than did the first group (Gardner and Smythe, 1973). English-speaking children in Wales, whose parents resented Welsh as the medium of instruction in school, did poorly in immersion programming (Jones, 1966).

Sociological factors, such as the relative prestige of the first and second languages (Paulston, 1974) and the learner's perceptions and beliefs about the other ethnolinguistic group (Lambert, 1974), have been cited as possible factors affecting the success of early immersion programs. These factors may be important in explaining the seemingly contradictory results with early immersion programs in different countries.

Thus, the debate continues. It does not seem to have been determined unequivocally that young children are indeed better language learners than are older children or adults. Nor is it clear to what extent biological maturation, cognitive development, or affective and situational variables are involved in achieving success at second-language learning at different age levels.

VARIABLES AFFECTING SUCCESS IN FRENCH IMMERSION PROGRAMS

A few studies have considered specific descriptive or test variables as they relate to performance in French immersion programs. Performance levels on IQ tests have received some attention. Dockrell and Brosseau (1967) investigated the relationship of chronological age, mental age, and attitude to three measures of French language achievement (vocabulary size, pronunciation, and comprehension) among forty children in French immersion Kindergarten. The older subjects showed greater improvement in vocabulary size and comprehension and less improvement in pronunciation than did the younger ones. Attitude measured in an interview was related to all aspects of French achievement, while an attitude questionnaire was related only to vocabulary size. General intelligence was correlated with vocabulary only, and not with comprehension or pronunciation. This correlational analysis did not give a clear picture of the factors affecting second-language learning or of the underlying complexity of such relationships.

Genesee, Allister, and Morin (1974) reported that IQ levels were related to the level of performance on tests of the formal aspects of French for pupils in a late French immersion program. However, IQ was not related to listening and speaking in French. The English language skills of children in Grade four of an early immersion program and of children in Grade seven of a late immersion program were investigated in relation to differences in IQ (Genesee, 1974). The children were divided into three IQ groups: above average (116 or above), average (96 to 115), and below average (95 or below). At each grade level, these three IQ groups differed significantly on six measures of English writing skills, with the above-average group rated highest, followed by the average and below-average groups. These findings suggest that IQ differences are related to success in French immersion in some aspects of French language skills and of English language skills in both early and late French immersion programs.

In addition to IQ and related scores, personality test scores have received some attention as they relate to success in French immersion. A comparison of Grade two children who dropped out of French immersion with Grade two children who remained in French immersion indicated that the drop-outs were more assertive and tense (Alexander, Hallows, and Tiltens, 1974).

Edwards and Casserly (1976) compared Grade two French immersion and Grade two English pupils on the Early School Personality Questionnaire. The immersion group tended to be more assertive and independent, as well as more critical and abstract in their thinking. These differences were attributed to "preselection factors affecting the parents' choice of a second language option for their child." Grade three French immersion children differed from regular English program pupils on several personality characteristics as measured by the Early School Personality Questionnaire (Edwards and Smyth, 1976). On one measure, there was evidence of greater anxiety among the French immersion group. In general, these comparisons have failed to find consistent personality differences between pupils in French immersion and the regular English program, suggesting that different preselection factors are probably at work.

Swain and Burnaby (1976) compared children in French immersion and the regular English program on nine personality traits rated by their Kindergarten teachers. Immersion program children were rated as happier, as having more perfectionist tendencies, and as being more talkative. These were considered to be traits that parents view as important for success in French immersion. The nine personality characteristics were also correlated with measures of French language achievement in Kindergarten, Grade one, and Grade two. Quickness in grasping new concepts and perfectionist tendencies were charactistics which significantly correlated most frequently with second-language scores.

Tucker, Hamayan, and Genesee (1976) investigated personality characteristics of Grade seven pupils using the Junior-Senior High School Personality Questionnaire. One group had been in French immersion since Kindergarten, while the other group had been in a regular English program prior to Grade seven French immersion. The personality characteristics important for success in learning French differed in these programs. Children in the one year late French immersion program were most successful in listening comprehension and oral production if they were adventuresome and attempted to use French in the community.

The Myklebust Pupil Rating Scale (Mykelbust, 1971) was completed by French and English teachers for French immersion and regular English program pupils from Grade one to Grade four (Edwards and Casserly, 1976; Edwards and Smyth, 1976). There were no consistent significant findings, but French and English teachers did tend to rate the children differently.

CHILDREN WITH LEARNING DISABILITIES IN FRENCH IMMERSION

Some children experience difficulties when they are immersed in the early grades in a second-language program. An early study in Montreal (Bruck, Rabinovitch, and Oates 1975), focused on the effects of French immersion programs on children with language disabilities. The investigators concluded that these children fare well, in that they learn to read in both English and French. They also concluded that the children's first-language acquisition did not appear to have been retarded by their placement in a French immersion program. However, there were several serious methodological difficulties with this study. The conclusions were based on an extremely small sample of subjects, basically a sample of three to six children depending on the date of follow-up.

In a later study, Bruck (1978) examined the suitability of primary French immersion for the language-disabled child. The achievement levels of children with language disabilities and of normal controls enrolled in primary French immersion were compared with those of children with language disabilities and of normal controls enrolled in the regular English program. The progress of the children was followed from Kindergarten to Grade three. Bruck (1978) concluded that "children with language-learning problems who attend French immersion programs can develop linguistic, cognitive and academic skills at a rate similar to that at which they would develop were they placed in an all-English classroom." She concluded that children who encounter difficulty in French immersion should remain in the program and receive remedial assistance in the French language. However, the validity of these conclusions must be viewed with caution. The language-disabled children in the English program had significantly lower performance-IQ scores in Kindergarten and in Grade three compared with the language-disabled children in the French immersion program. Non-verbal aspects of cognitive functioning may influence which children remain in French immersion and which children transfer out of the program. The problem group in French immersion had the highest attrition rate of all groups. The children who remained in the program to Grade three probably represent a select, more able group compared to the problem group in the English program. Trites and Price (1977) found that the children who transferred out of the French immersion program had a lower verbal IQ and were experiencing a greater degree of academic difficulty than the children who remained in French immersion in spite of difficulties. Thus, one must consider that the groups compared by Bruck (1978) may not have been disabled to the same extent and that the more disabled children did not remain in the French immersion program to the end of the longitudinal study. In addition, the progress of the problem groups in English reading tended to be at or above grade level. This suggests that the initial diagnoses of language disability are questionable. It should also be noted that progress in the French language of problem children in French immersion was measured up to the Grade three level by a test appropriate for Grade one children. The scores at Grades two and three may represent ceiling effects.

SECOND-LANGUAGE LEARNING AND READING

Controversy exists over the advisability of introducing reading in the second language to a child before he or she learns to read in the native tongue. Downing (unpublished paper) has suggested that the mismatch between home and school language causes retardation in the development of reading skills. Studies cited earlier pointed to the retardation of reading skills in both the first and second language when the child was taught to read initially in the second language (Macnamara, 1966), to the retardation in native-language reading skills when initial reading was taught in a second language (Jones, 1966), and to improved reading ability in the second language when the child was taught to read initially in the vernacular (Modiano, 1968). Miller (1973) also pointed out the importance of the match of home and school environments for success in reading. Gezi (1974) reviewed studies of bilingual and bicultural education and stressed the importance of the native tongue as a medium of instruction.

In contrast, studies of the reading skills of children in French immersion programs in Canada indicated that their reading levels in French were below those of French monolinguals, but that any retardation in English language skills is overcome with the introduction of formal English reading instruction. Swain (1974) has suggested that it is easier to read in French than in English because the former has a more systematic sound-symbol correspondence. The basics of reading are then easily transferred, since the vocabulary and language structures are already established. However, contradictory findings regarding reading achievement in English arise when one compares children in partial French immersion programs, who are taught to read in English initially, to children in total French immersion programs, who are taught to read in French initially. Swain (1974) reported that one group of children in a partial French immersion program were better readers in English in Grades one, two, and three than children in a total French immersion program who had not had any English language arts instruction; however, Grade two or Grade three children in a total French immersion program who had received one year of English language arts instruction could read as well in English as children in the same grade in a partial French immersion program. Both immersion groups had lower English reading test scores than Grade two or three children in the regular English program. Thus, in this sample, learning to read in the vernacular did not appear to enhance reading skills.

In contrast, another group of children in a partial French immersion program who were taught to read initially in English, did appear to have enhanced reading skills in English. Children in a Grade three partial immersion class were better readers in English than children in a total French immersion program regardless of the grade at which English language arts were introduced. With regard to reading skills in French, being taught to read initially in French appears to promote better reading skills in French, since children in total French immersion outperformed children in partial French immersion on French reading tests. However, when comparisons were made on the basis of amount of exposure to French, partial immersion programs appeared to produce levels of proficiency in reading French comparable to the reading levels achieved by children in total French immersion programs. Both immersion groups were poorer readers in French than French monolinguals.

Tucker (1975) reported that for pupils in Grade one and Grade two French immersion programs, reading achievement in French was a good predictor of reading achievement in English at each grade level. The apparently easy transfer of reading skills from French to English was stressed.

McDougall and Bruck (1976) investigated the effect on native-language skills when initial reading instruction was in the second language and when native-tongue instruction was introduced at different grade levels, that is, Grade two (early) or Grade three (late). The French immersion students were in Grades three and four when tested. The early and late English reading groups did not differ in English reading as measured by the Spache Diagnostic Reading Scales, nor did they differ from children in the regular English program. The authors concluded that a great amount of knowledge must be transferred from French to English and that this transfer is accelerated in the case of the group receiving English reading beginning in Grade three. French reading levels were not compared. These results emphasize good progress

in English reading following initial reading instruction in French. However, these results should be considered with caution. Only one measure of reading achievement was employed. As well, the formal introduction of English reading in Grade three does not necessarily reflect the actual amount of experience the children had in reading in English. They were from middle-class homes where parents probably encouraged and supported the development of native-tongue literacy (Tucker, 1975). The longer formal English reading instruction is delayed, the more likely it is that these parents would take an active role in promoting these skills.

Cziko (1976) examined reading achievement in both English and French among Grade four children in different school programs. The groups included early French immersion (children in French immersion from Kindergarten); late French immersion (children who were in a regular English program until Grade four, when they entered French immersion); a regular English program; and a regular French program. There were no significant differences among the first three groups in English reading. The late immersion group did as well as the early immersion group in French reading. French and English reading ability were positively correlated. The authors concluded that neither early nor late French immersion has detrimental effects on English reading and that there is a good transfer of reading skills across languages. However, there was no evidence of greater transfer from French to English than from English to French. The reading test data did not indicate any advantages gained from an earlier start in learning French on French reading skills. Nor was there evidence that reading instruction in the vernacular initially enhanced reading in the vernacular or in the second language. The possible influence of parents upon the native-tongue language skills of French immersion children may have influenced these results.

In addition to the contradictory evidence from studies comparing children in total French immersion programs who are taught to read in French initially with children in partial French immersion programs who are taught to read in English initially, studies reporting difficulties in other settings are also interesting. Cowan and Sarmed (1976) compared the performance of Persian-speaking children in English immersion or in a bilingual (50-50) English-Persian program with Persian-speaking and English-speaking children on measures of reading in English and Persian. The children in the immersion and bilingual schools were inferior to monolinguals in reading both Persian and English, especially Persian. The English immersion program did not produce higher reading levels in English compared to the bilingual (50-50) program, which failed to enhance reading skills in either language despite the use of the vernacular. Reading in both languages was suppressed in both the immersion and bilingual programs in contrast to the Canadian results (e.g., Lambert and Tucker, 1972).

There is evidence that the simultaneous introduction of reading in two languages may cause confusion. Cohen, Fathman, and Merino (1976) compared Spanish-speaking children educated in an English school with those in a Spanish-English bilingual program on measures of reading in English and Spanish. By Grade five, the English school children surpassed the bilingual program children on measures of English reading while the reverse was true on measures of Spanish reading. The poor performance by bilingual school children on English

reading was attributed to the simultaneous introduction of reading in the two languages by the same teacher.

In view of contradictory evidence, further investigation of this problem is needed and, as yet, no definitive statement can be made regarding the optimal sequencing of initial reading instruction in bilingual educational programs (Engle, 1975). Tucker (1975) discussed the conflicting results of studies on the sequencing of reading instruction in the vernacular and the second language. He claimed that initial teaching in the vernacular failed to affect pupils' performance in some studies in contrast to others because several factors influenced native-tongue development in children receiving initial reading instruction in their second language. These, he said, included the existence of a vernacular literary tradition, the encouragement of native-tongue literacy by parents and the community, the similarity of orthographic representations, and the structural similarity of the two languages (Tucker, 1975).

SPECIFIC NEUROLOGICAL SUBSTRATES OF LANGUAGE LEARNING

Factors other than IQ, attitude, personality type, and age at which a second language is introduced must be considered in attempting to understand the progress or lack of progress by an individual child in a second-language learning program. One factor that obviously must be considered is the adequacy of the functioning of the brain regions subserving language processes. The brain areas strongly implicated in language learning are the temporal lobes. Not only does the brain region contain the auditory cortex, but the temporal lobes have been implicated in verbal and non-verbal auditory processing and memory functions. Important studies dating back over twenty years (Kimura, 1961; Milner, 1954, 1958) have demonstrated the effects of damage or dysfunction in temporal-lobe regions on psychological functions. The deficits in learning associated with disturbances of temporal-lobe function are not restricted to gross alterations of behaviour, but may include difficulty in learning verbal associations and deficits in the delayed recall of verbal and non-verbal material (Diamond, 1972). The right and left temporal lobes subserve different psychological functions: impairment of the left temporal lobe often leads to deficits on verbal tests and dysfunction in the right temporal lobe is more likely to lead to non-verbal visual-symbolic perceptual and memory deficits. The obvious psychological nature of the functions subserved by the temporal lobes, and more specifically the verbal and auditory components, give this brain region a high profile when a neurological model of language learning is considered.

The above review indicates that immersing children in a second language at an early age has met with considerable success in some settings, but with far less success in others. In addition to the age at which the language is introduced and the way it is introduced, research studies indicate that factors such as language aptitude, stage of cognitive development, affective variables, attitudes, and other factors are also important to consider. We have also seen that an understanding of brain maturation, structure, and function may play a particularly important role in understanding more about second-language acquisition in young children.

BACKGROUND AND AIMS

FRENCH IMMERSION PROGRAMS IN THE OTTAWA AREA

Four Ottawa area school boards instituted early French immersion programs in 1969 and 1970. In the Ottawa and Carleton Public School Boards all instruction at the Kindergarten and Grade one levels is in French. English language arts are introduced in Grade two, constituting 20% of the daily instruction time. This percentage remains the same until the end of Grade five in the Ottawa Board program, and increases to 35% by the end of Grade five in the Carleton Board. From Grade six until high school, instruction is in French for half the day and in English for the other half.

When it first began offering early French immersion, the Ottawa Roman Catholic Separate School Board introduced English language arts for 20% of the day in Grade three, increasing this to 50% of the day in Grade four. In 1975, this French immersion program was replaced by a "partial immersion" or "bilingual" program in which equal time is given to instruction in English and French from four-year-old Kindergarten until high school.

The schools in the Carleton Roman Catholic Separate School Board offered a variety of programs on a somewhat experimental basis beginning in 1969. Today, they offer an "intensive French" program from Kindergarten to Grade seven in which one quarter of the day is devoted to instruction in French. At the Grade seven level, instruction is 50% in English and 50% in French.

FINDINGS OF PREVIOUS YEARS OF THE STUDY

Learning Disabilities Found in Association with French Immersion Programming

One of the functions of the Neuropsychology Laboratory at the Royal Ottawa Hospital, in operation since late 1969, is to perform a detailed examination of children with learning disabilities. Children referred to the laboratory are given a six to eight hour examination with tests which have been standardized in Ottawa in French and English. The test battery is designed to determine the type of learning disability the child may have and to help in determining the cause of the disability.

It had become apparent by 1973 that increasing numbers of children from French immersion programs were being referred to the Neuropsychology Laboratory for examination. Most of the children showed important deficiencies in their school progress in spite of at least normal intelligence, and no evidence of brain dysfunction. Also, in general, these children could not readily be classified as having dyslexia, other types of perceptual or learning disabilities, or "minimal cerebral dysfunction". It was considered possible that, if these children were in an English language program, their progress through school might have been uneventful. By surveying the literature, an attempt was made to see what factors were correlated with poor progress in immersion programs. It was clear that there are no guidelines available for attempting to identify high-risk children.

It was the purpose of a preliminary descriptive study (Trites and Price, 1976) to identify a group of children who were described by their teachers and parents as having difficulty in their French immersion programs. The aim of the study was to see if these children resembled, in any consistent way, other groups of children who had difficulty in school progress. A total of seven control groups were composed. Three control groups included children from English language backgrounds who were enrolled in a French-speaking school. A French school in the Ottawa area differs from a French immersion program in that, not only is the language of instruction in the classroom French, but the classmates are essentially native French-speaking children and French is generally the language of communication outside of the classroom. A second language control group included children from other ethnic backgrounds (Italian, Greek, etc.) who attended English language schools. A third language control group included children from French-speaking homes who attended a French language school. For further comparison, four other clinical groups of children were composed: children who were diagnosed as having a primary reading disability (dyslexia); children who were hyperactive; children who were diagnosed as having behavioural or personality adjustment problems; and children who were classified as having "minimal cerebral dysfunction". These "non-language" comparison groups were included to see if children who have difficulty in a French immersion program resemble, in important ways, children who might have been expected to have difficulty in any event. For example, if it turned out that the profiles of the French immersion difficulty group and the dyslexic group were extremely similar, then it could be concluded that these children would likely have had difficulty in any event, particularly as the development of reading and spelling skills is concerned. An additional but small group of children who were considered to be doing well in their French immersion program was also identified and used for further comparison purposes. Many of the children in the French immersion group were brought in for follow-up testing to assess their progress on selected measures including academic achievement tests. Various questionnaires and demographic forms were also completed at that time.

It was found that children who have difficulty in primary French immersion were distinct from children diagnosed as having a primary reading disability, minimal brain dysfunction, a primary emotional disturbance, or as being hyperactive. The children with difficulty in French immersion had a unique pattern of deficits. This group had a high IQ and excellent motor and sensory functions, and yet performed the most poorly on a complex psychomotor problem-solving test. The findings were interpreted as evidence of a maturational lag in the temporal lobe regions of the brain. It is known that the temporal lobes are important structures in subserving verbal and nonverbal perceptual and memory functions, as well as containing the auditory centres of the cerebral cortex.

A second study (Trites and Price, 1977) was undertaken to cross-validate the findings of the first study using a non-clinical sample and to further delineate the maturational deficit. Sixteen children who had dropped out of French immersion (drop-out) were matched for age and sex with 16 children who began in the same French immersion class as the drop-outs but were still doing well in the French immersion program (control). The control group was characterized as having higher scores on IQ tests, a higher socioeconomic level, and a history of starting nursery school at an earlier age compared with the drop-out group. The

neuro-psychological profiles of drop-outs and controls were substantially different. With IQ controlled statistically, these groups differed on behaviour rating scales and specialized reading subskill tests of oral reading and comprehension. The earlier finding of a tactual performance deficit suggesting a specific maturational lag in temporal lobe regions in the Drop-out group was evident. The difference was statistically significant in younger children (below age nine), but, consistent with a maturational lag hypothesis, the differences had disappeared in the over-age-nine group, although the trend was still in favour of the control group. Sub-groups of drop-outs were observed with the pattern of deficits in the left-handed drop-outs differing from the pattern of deficits in the right-handed drop-outs.

Assessment of Readiness for Primary French Immersion

From our initial work, it was clear that not all children of above-average intelligence in combination with excellent motor and sensory skills experienced success in the primary French immersion program. Although parents' decisions to enrol a child in French immersion may be guided by informed and widely-used selection procedures, no set of variables had been validated as predictive of success or failure in the primary French immersion program.

The early identification of children who are at high risk for failure in a primary French immersion program was the goal of a seven-year study which began during the 1976-77 school year. This report presents the results of the final phase of this study which was designed to identify a set of variables predictive of success or failure in primary French immersion.

In the first phase of this project, a battery of tests was administered to children in the spring of their English four-year-old Kindergarten program prior to enrolment in a primary French immersion program. In the second phase, the predictive validity of the measures obtained in four-year-old Kindergarten was assessed in terms of criterion measures of academic achievement in English and French obtained in the spring of five-year-old French immersion Kindergarten. Additional measures of psychomotor problem-solving ability and readiness skills of listening comprehension and problem-solving were also obtained in the second phase to be evaluated as predictors of future achievement in the Grade one program. In the third, fourth and fifth phases, the predictive validity of the variables assessed in the four- and five-year-old Kindergarten evaluations was evaluated in terms of criterion measures of achievement in English and French at the end of Grades one, four and five.

Four-Year-Old Kindergarten Early Identification Assessment (1977). The first phase of the seven-year study is described in detail elsewhere (Trites and Price, 1978). In the spring of 1977, biographical and background information and teacher ratings were obtained for the 1330 children then in four-year-old English Kindergarten.

Descriptive information collected for these children indicated that there were differences in family characteristics of children entering French immersion and those entering the regular English program. Children entering French immersion tended to come from higher socioeconomic status homes than children entering the English program. The French immersion

enrolments were also treated differently by their parents in that they attended preschool more frequently and were read to at home more frequently.

Parental attitudes towards the French language also differed. Parents who planned to enrol their children in French immersion tended to express greater interest in speaking or learning to speak French themselves compared to parents choosing the English program. Parents' reasons for choosing or not choosing French immersion appeared to be based upon the educational goals that they considered to be important (such as functional bilingualism as opposed to a solid grounding in English language skills). The choices were frequently made irrespective of the child's particular learning characteristics and seemed to reflect more a "life-style" decision.

The teacher ratings at the end of four-year-old Kindergarten showed that consistent, although informal, criteria were used in either recommending or not recommending children for primary French immersion programs. French immersion was recommended for children whom the teachers considered to be above average in ability, motivation and social maturation. The criteria for advising against enrolment were different from the reasons usually cited in recommending French immersion enrolment.

A random sample of 200 children whose parents said they planned to enrol their child in the French immersion program for five-year-old Kindergarten were selected to receive a special battery of tests designated herein as the Early Identification Assessment Battery. This test battery included measures of intelligence, readiness skills, language abilities, and problem-solving abilities. The sampling procedures by which these 200 children were selected from among over 450 children who were to be enrolled in five-year-old French immersion Kindergarten in September of 1977 are described in detail in Trites and Price (1978). Comparisons between the sample of 200 and the other children entering five-year-old French immersion Kindergarten indicated that the sample was representative of children entering French immersion following four-year-old English Kindergarten.

Consequently, these children were retested four times: at the end of five-year-old Kindergarten, Grade one, Grade four, and Grade five. The predictive validity of the data obtained from the intensive assessment of the sample of 200 children at age four was to be evaluated in terms of academic achievement at each of these follow-up testings.

Five-Year-Old Kindergarten Follow-Up Assessment (1978). The detailed report of the second phase of this study is presented elsewhere (Trites and Price, 1979). One hundred and eighty-four of the 200 children assessed intensively in the first phase were located for the follow-up assessment in the spring of 1978.

The predictive validity of the measures obtained in four-year-old Kindergarten was assessed in terms of measures of achievement obtained for the 159 children in the five-year-old French immersion program. Stepwise multiple linear regression analyses and Pearson product-moment correlations were computed for 35 predictors of the Early Identification Assessment Battery and 11 criterion variables of the Kindergarten Follow-Up

Assessment Battery. Although better prediction was accomplished for measures of English language achievement than for measures of French language achievement, well-defined differences were found between groups classified as low and high achievers on the basis of a measure of French comprehension.

These findings indicated that identifiable relationships and differences may eventually be used to predict a group of children who will not progress well in the French immersion program.

Grade One Follow-Up Assessment (1979). The third phase of the study is presented in detail elsewhere (Trites and Price, 1980). In this phase of the research study, 169 children were located for a follow-up assessment. The predictive validity of the measures obtained in four-year-old Kindergarten and of selected predictors obtained in five-year-old Kindergarten were evaluated in the light of outcome measures in the spring of the Grade one program for the 124 children who were then in the French immersion program and for the 25 children who had dropped out of French immersion and transferred to an English program.

The four-year-old Kindergarten Early Identification Assessment Battery was found to accurately predict those who experienced great difficulty in French Immersion and dropped out, as well as those who remained in the program and became low or high achievers. The test scores were found to be more accurate than background variables (such as socioeconomic status and family characteristics) or teacher ratings in predicting achievement.

Grades Four and Five Follow-Up Assessments (1982, 1983). The fourth and fifth phases of the study are presented in detail in this report. The predictive validity of the Early Identification Assessment Battery and five-year-old Kindergarten Follow-Up Assessment Battery was assessed using the measures obtained at the 1982 and 1983 testings. Extensive comparisons of the children who had dropped out of French immersion and those who remained in the program as low or high achievers were made.

THE SAMPLE

HISTORY OF THE SAMPLE

The original sample consisted of 200 children in four-year-old Kindergarten whose parents said they planned to enrol their child in the French immersion program. The yearly school programs of these children are traced in tables 1, 2 and 3.

All the children attended a four-year-old English Kindergarten program. As can be seen in table 1, 16 children left the study before the five-year-old Kindergarten (1978) assessment. Of the 184 children tested at that time, 159 were in five-year-old French immersion Kindergarten, 1 was in Grade one French immersion, 6 had dropped out of French immersion and were attending five-year-old English Kindergarten, 11 had never been in French immersion (10 of these were attending five-year-old English Kindergarten and 1 was in Grade one English), and 7 were in five-year-old bilingual Kindergarten.

At the time of the Grade one (1979) testing, 15 more children had left the study (see table 2) leaving 169 subjects. Of these, 124 were in French immersion Grade one, 1 was in five-year-old French immersion Kindergarten, 1 was in Grade two French immersion, 25 had dropped out of French immersion and were attending English Grade one, 11 had never been in French immersion (9 were in English Grade one, 1 was in English Grade three and 1 was in special education), 5 were in bilingual Grade one, 1 was in Grade one in a French school, and 1 had transferred from the bilingual program into English Grade one.

At the time of the Grade four (1982) testing, 31 more children had left the study, leaving 138 subjects (see table 3). Of these, 92 were in French immersion Grade four, 1 was in French immersion Grade three, 1 was in French immersion Grade five, 29 had dropped out of French immersion and were in the English program (18 were in Grade four, 9 were in Grade three, 1 was in Grade five and 1 was in special education), 9 had never been in French immersion (6 were in grade four, 1 was in grade six, 1 was in special education and 1 had gone into the bilingual program and was in Grade four), 2 were in Grade four English having transferred from the bilingual program, and 4 were in Grade four in the bilingual program.

TABLE 1

SCHOOL PROGRAMS OF CHILDREN TRACED FROM 1978-1979

1978 Testing School Program	#	Left Study	#	1979 Testing School Program
French immersion: 5-year-old Kindergarten	159	12	124	French immersion: Grade 1
			1	French immersion: 5-year-old Kindergarten
			20	English: Grade 1 (Dropped out before 1979)
			2	Bilingual: Grade 1
French immersion: Grade 1	1		1	French immersion: Grade 2
English: 5-year-old Kindergarten (Dropped out before 1978)	6	1	5	English: Grade 1
English: 5-year-old Kindergarten (Never in French immersion)	10		9	English: Grade 1 (Never in French immersion)
			1	Special education (Never in French immersion)
English: Grade 1 (Never in French immersion	1		1	English: Grade 3 (Never in French immersion)
Bilingual: 5-year-old Kindergarten	7	2	3	Bilingual: Grade 1
			1	English: Grade 1
			1	French: Grade 1
	184	15	169	

TABLE 2

SCHOOL PROGRAMS OF CHILDREN TRACED FROM 1979-1982

1979 Testing School Program	#	Left Study	#	1982 Testing School Program
French immersion: Grade 1	124	18	92	French immersion: Grade 4
			1	Grade 3
			1	Grade 5
			12	English: Grade 4 (7) (New drop-outs)
				Grade 3 (5) (New drop-outs)
French immersion: Grade 2	1		1	English: Grade 5 (New drop-out)
French immersion: 5-year-old Kindergarten	1		1	Grade 3 (New drop-out)
English: Grade 1 (Dropped out between 1977-1978)	5	2	2	English: Grade 4
			1	Grade 3
English: Grade 1 (Dropped out between 1978-1979)	20	8	9	English: Grade 4
			2	Grade 3
			1	Special education
English: Grade 1 (Never in French immersion)	9	2	6	English: Grade 4
			1	Bilingual: Grade 4
English: Special education	1		1	Special education
English: Grade 3 (Never in French immersion)	1		1	English: Grade 6
English: Grade 1 (Transfer from bilingual)	1		1	English: Grade 4
Bilingual: Grade 1	5		4	Bilingual: Grade 4
			1	English: Grade 4 (Transferred)
French School: Grade 1	1	1		
	169	31	138	

TABLE 3

SCHOOL PROGRAMS OF CHILDREN TRACED FROM 1982-1983

1982 Testing School Program	#	Left Study	#	1983 Testing School Program
French immersion: Grade 4	92	7	79	French immersion: Grade 5
			1	Grade 4
			4	English: Grade 5 (New drop-outs)
			1	Grade 4 (New drop-out)
Grade 3	1		1	French immersion: Grade 4
Grade 5	1	1		
English: Grade 4 (1979-1982 drop-out)	7	4	3	English: Grade 5
Grade 3 (1979-1982 drop-out)	5		5	Grade 4
Grade 5 (1979-1982 drop-out)	1		1	Grade 6
Grade 3 (1979-1982 drop-out)	1		1	Grade 4
Grade 4 (1977-1978 drop-out)	2		2	Grade 5
Grade 3 (1977-1978 drop-out)	1		1	Special education
Grade 4 (1978-1979 drop-out)	9	2	7	English: Grade 5
Grade 3 (1978-1979 drop-out)	2	1	1	Grade 4
Special education (1978-1979 drop-out)	1	1		
English: Grade 4 (Never in French immersion)	6	2	4	English: Grade 5
Bilingual: Grade 4 (Never in French immersion)	1		1	Bilingual: Grade 5
Special Education: (Never in French immersion)	1		1	Special education
English: Grade 6 (Never in French immersion)	1		1	English: Grade 7
English: Grade 4 (Transferred from bilingual 1978-1979)	1		1	English: Grade 5
Bilingual: Grade 4	4	1	1	French immersion: Grade 5
			1	Bilingual: Grade 5
			1	English: Grade 5
English: Grade 4 (Transferred from bilingual 1979-1982)	1		1	Intensive French: Grade 5
	138	19	119	

SAMPLE AT 1983 FOLLOW-UP ASSESSMENT

At the time of the Grade five (1983) testing 19 more children had left the study, leaving 119 subjects (see table 4). Of these, 80 were in Grade five French immersion (1 had transferred from the bilingual program), 2 were in Grade four French immersion, 26 had dropped out of French immersion and were in the English program (8 were in Grade four, 16 were in Grade five, 1 was in Grade 6 and 1 was in special education), 7 had never been in French immersion (4 were in Grade five English, 1 was in Grade seven English, 1 was in special education and 1 was in bilingual grade five), 2 were in Grade five English (having transferred from the bilingual program), 1 was in bilingual Grade five, and 1 was in Grade five in an "intensive French" program having previously transferred from the bilingual program to the English program.

The overall attrition rate of the 200 original subjects from the 1977 testing to the 1983 testing was 40.5%. Most subjects left the study because their family moved out of the Ottawa area (n=56). The next most frequent reason for subjects leaving the study was withdrawal of permission to continue testing (n=23). One subject was too ill to be retested and one subject had died.

TABLE 4

SUMMARY OF SCHOOL PROGRAMS IN THE SPRING OF 1983

School Program	Number of Children
French immersion:	
Grade 4	2
Grade 5	80
English:	
Grade 4 (Academic drop-outs)	8
Grade 5 (Academic drop-outs)	9
(Non-academic drop-outs)	7
(Never in French immersion)	6
Grade 6 (Non-academic drop-out)	1
Grade 7 (Never in French immersion)	1
Bilingual:	
Grade 5	2
Intensive French:	
Grade 5	1
Special education:	
(Academic drop-out)	1
(Never in French immersion)	1
	119

THE TEST BATTERIES

A large number of objective test measures, behaviour ratings, and questionnaire information was obtained for the children in this study over the five testings. The measures in the five assessment batteries are listed in Appendix I along with their abbreviated (computer code) names. Descriptions of all the measures are given below.

QUESTIONNAIRE DATA

Teacher questionnaires

At each testing, teachers were asked to complete a questionnaire for each child in their class, rating them on various aspects of academic and social achievement and reporting any school difficulties and special help which the children received. These questionnaires are reproduced in Appendix II.

Parent questionnaires

Parents were asked at each testing to complete a fairly detailed questionnaire on their children. These questionnaires are reproduced in Appendix III. In four-year-old Kindergarten a "Biographical and Background Information" questionnaire was completed by the parents. This questionnaire was designed to obtain biographical and background information that may be related to selection of a school program, to identify characteristics held important by parents in program selection, and provide a basis for assessing the representativeness or uniqueness of children enrolled in French immersion kindergarten. This questionnaire was concerned with characteristics of the children, of their parents and of their homes. The factors assessed included age, sex, hand dominance, preschool experience, socioeconomic status, number of books in the home, languages in the home, parental attitudes towards learning French, parents' reasons for choosing the regular English program or the French immersion program for five-year-old Kindergarten, and characteristics parents considered to be important for success in French immersion.

At all the other grade levels, parents of children in French immersion answered questions concerning their child's progress and adjustment in French immersion, and parents who had withdrawn their children from French immersion gave their reasons for doing so and rated their children on their progress in English.

Subject questionnaire

At the Grade five level, subjects were asked a number of questions about their use of French in and out of school, and their thoughts and feelings about French immersion. This questionnaire is shown in Appendix IV.

OBJECTIVE TESTS

The objective test measures given throughout the five testings are listed and described below. As several of the tests were administered more than once, the years that they were given are indicated in parentheses (with Kindergarten abbreviated as "K", grade as "G").

Wechsler Preschool and Primary Scale of Intelligence (WPPSI) (Wechsler, 1963)

Scores: Verbal I.Q., Performance I.Q., Full Scale I.Q., Subtest Scores

Years given: 4K

Peabody Picture Vocabulary Test (Dunn, 1965)

Form B. This test is a measure of receptive vocabulary in English.
Scores: Mental Age and I.Q.

Form A. Form A items are presented in a novel manner designed to measure reading vocabulary. The child is required to read each item typed on an index card and to pick out the appropriate corresponding picture.
Scores: Mental Age and I.Q.

Form B - Form A. The discrepancy between the child's receptive vocabulary and reading vocabulary was calculated.

Years given: 4K, 5K (form B only)
G1, G4, G5 (forms B and A)

Raven's Coloured Matrices, board form (Raven, 1965)

Consists of a booklet of patterns with missing pieces. The child is required to choose the piece to complete the pattern from among six moveable pieces of the same size and shape and to place this piece on the pattern in the correct orientation. Measures performance I.Q.

Scores: raw score and percentile score

Years given: 4K

Wide Range Achievement Test (WRAT) (Jastak and Jastak, 1965)

Scores: reading, spelling, and arithmetic grade scores

Years given: 4K, 5K, G1, G4, G5

Measure of Hand Dominance (Harris, 1957)

The child is asked to demonstrate various tasks. The hand used is recorded. In cases of mixed dominance, the hand used in name writing and pencil work is considered to be dominant.

Years given: 4K, 5K

Picture Naming in French (Trites and Price, 1977)

The child is asked to name, as quickly as he can, 60 black and white pictures laid out on three large sheets (5 horizontal rows of 12 pictures each). The time required to complete this task and an error score are recorded. The error score consists of the

number of pictures incorrectly named, or omitted, and partial scores for imprecise names (e.g. "hat" for "cap", or "man" for" farmer").

Scores: time and error scores

Years given: 4K (60 pictures); 5K, G1 (20 pictures only)

Colour Naming (Trites and Price, 1977)

The child is asked to name 10 colours and the number correctly named is recorded. The colours were matched against the centroid colours of the Inter-Society Colour Council, National Bureau of Standards (ISCC-NBS) Colour Name Charts. The following colours are used: vivid red (11), vivid yellowish green (129), vivid greenish yellow (97), vivid purplish blue (194), vivid orange (48), black (267), vivid reddish purple (236), dark brown (59), yellowish white (263) and medium gray (265). A strip measuring 7 3/4 inches by 1½ inches was divided into coloured rectangles (3/4 inch by 1½ inches) arranged in the above order from vivid red to medium gray.

Scores: number correct

Years given: 4K

Word Segmentation (Fox and Routh, 1975) (Adaptation)

The child is required to segment words into syllables or other units smaller than the words given. The words are presented orally and the child's spoken response is recorded. Sixteen bisyllabic words are used (8 from Fox and Routh (1975) and an additional 8 of similar structure.)

Scores: number of words segmented at conventional syllable boundaries,
number of words segmented into units smaller than the words.

Years given: 4K, 5K

Renfrew Action Picture Test (Renfrew, 1971)

The child is asked to give verbal descriptions of 9 pictures. This test is a measure of expressive language skills.

Scores: information and grammar scores

Years given: 4K, 5K, G1

CIRCUS: An Assessment Program for Pre-primary Children (Educational Testing Service, 1974)

Circus #2: How Much and How Many - knowledge of quantitative concepts such as counting, relational terms and numerical concepts

Circus #5: Finding Letters and Numbers - letter and numerical recognition and discrimination

Circus #7: How Words Sound - auditory discrimination

Circus #9: Listen to the Story - comprehension, interpretation and recall of oral language

Circus #13: Think It Through - problem solving

Years given: 4K 5K (#9 and #13 only)

Tactual Performance Test (Trites, 1977)

This is a measure of psychomotor problem-solving ability, performed under blindfold conditions, during which blocks of varying sizes and shapes are placed into respective spaces on a formboard. The task is performed in three trials: first, with the dominant hand, then with the non-dominant hand, and finally with both hands together. The length of time required to perform the task and the number of blocks correctly placed are recorded for each trial. Following completion of the task, the child is asked to draw the formboard and the blocks. The number of blocks remembered (memory component) and the number of blocks located correctly (spatial component) are recorded.

Scores: time scores, number of blocks correctly drawn (memory) and correctly placed (location).

Years given: 4K (3 blocks), 5K (6 blocks), G5 (8 blocks)

French Comprehension Test (Barik, 1976)

The French Comprehension Test is designed to measure French comprehension skills of English-speaking pupils in immersion programs who have received all of their school instruction in French throughout Kindergarten (half-days) and Grade one.

Scores: raw scores and percentiles

Years given: 5K, G1

Test de Rendement en Francais (La Commission des Ecoles Catholiques de Montréal, 1973-74 edition)

This is a test of reading achievement in French with separate tests for each grade level.

Scores: raw scores and stanines

Years given: G1, G4, G5

Knowledge of Numbers and the Alphabet in French (Trites and Price, 1978)

The child is required to name in French the 13 alphabet characters of the Wide Range Achievement Test (Jastak and Jastak, 1965) reading subtest, to count the 15 dots and identify the 5 numbers from the arithmetic subtest in French. The number of letters correctly named and the number of dots counted and numbers named correctly are recorded.

Scores: number of letters and numbers named correctly

Years given: 5K, G1

Children's Personality Questionnaire (Porter and Cattell, 1968)

A measure of 14 dimensions of personality, each of which is defined by two poles or extremes.

Scores: raw scores and sten (standard ten) scores

Years given: G5

RATING SCALES

Pupil Rating Scale (Myklebust, 1971)

The teacher rated each child on items reflecting auditory comprehension, spoken language, orientation, motor coordination, and personal-social behaviour.

Scores: Subscale scores, Verbal score, Nonverbal scores, Total score

Years given: 4K

Test Behaviour Observation Guide (Atwell, Orpet and Meyers, 1967) (Appendix V)

Following the individual testing session, the examiner rated the child behaviour during testing in terms of ten 9-point scales.

Years given: 4K, 5K, G1, G4, G5

Connors Teacher Rating Scale (Connors, 1969) (Appendix VI)

The teacher rated each child on 39 items relating to classroom behaviour, group participation and, attitude toward authority. These ratings yielded percent scores reflecting conduct problems, inattentive-passive behaviour, tension-anxiety, and hyperactivity.

Scores: raw scores and percentage scores

Years given: 4K, 5K, G1, G4, G5

Connors Parent Questionnaire (Connors, 1969) (Appendix VII)

Parents rated their child on 93 items related to home behaviour, bodily functions, and social behaviour. These ratings yielded percentage scores reflecting conduct problems, anxiety, impulsive-hyperactive behaviour, learning problems, psychosomatic symptoms, perfectionism, antisocial behaviour, and muscular tension.

Scores: raw scores and percentage scores

Years given: G4, G5

RESULTS

1983 ENROLMENT GROUPS

At the 1983 testing the children were categorized into five enrolment groups: French immersion, drop-outs from French immersion, English (never in French immersion), bilingual, and intensive French. The French immersion and drop-out groups are the main focus of this study and extensive comparisons of these groups will be presented in later sections. The English (never in French immersion), bilingual, and intensive French groups had very small enrolments and will not be described or otherwise involved in the statistical analyses in this report.

French Immersion Group

In the spring of 1983, 82 children were enrolled in the French immersion program. Eighty of these children were in Grade five and 79 of the 80 had been in French immersion since the beginning of five-year-old Kindergarten. The other child entered Grade five French immersion after having been in the Roman Catholic Separate School program. The other 2 children were in Grade four, having attended French immersion since five-year-old Kindergarten. One had repeated Grade three and the other was repeating Grade four.

For the purpose of analysis, two subgroups were extracted from the French immersion group: low achievers (n=10) and high achievers (n=13). The child who had transferred from the bilingual program and the 2 Grade four students were eliminated from the analyses, leaving a total of 79 French immersion 'success' subjects.

Low achievers (n=10). Low achievers were defined as children who scored at or below one standard deviation away from the mean score for all 79 French immersion subjects on the Test de Rendement en Français, level 5. The mean score on this test for the 79 French immersion students was 17.03; standard deviation 4.8. As well, low achievers received average or below-average ratings by their French immersion teachers on comprehension of French, oral skills in French, reading skills in French, spelling in French, and willingness and confidence in the French language.

High achievers (n=13). High achievers scored at or above one standard deviation above the mean on the Test de Rendement en Français, level 5, and received at least two above-average ratings and no below-average ratings by their French immersion teachers on the scales mentioned above.

Drop-Out Group

At the time of the 1983 testing, 45 children were known to have dropped out of the French immersion program. Of these, 34 were considered to have dropped out for reasons of academic difficulty based on parent and school reports. The other 11 were seen as having dropped out for reasons unrelated to academic difficulty.

Twenty-six of the 45 drop-outs were tested in 1983. Eighteen of these were academic drop-outs and 8 were non-academic drop-outs. The 18 academic drop-outs tested in 1983 will be referred to in this report as the 1983 academic drop-outs.

For the purpose of more in-depth analysis of drop-outs, much of the analysis will involve all the known academic drop-outs (n=34) even though almost one-half of them had left the study and were not tested in 1983. These 34 academic drop-outs were divided into two groups: early drop-outs and late drop-outs.

Early drop-outs (n=17). These children had left the French immersion program by the beginning of Grade one (n=15) or by the middle of Grade one (n=2). Most of the children had spent only one year (five-year-old Kindergarten) in French immersion. Six early drop-outs were tested in 1983.

Late drop-outs (n=17). These children had left the French immersion program at the beginning of Grade two (n=6), mid-Grade two (n=2), mid-Grade three (n=1), end of Grade three (n=4), end of Grade four (n=3) and beginning of Grade five (n=1). Twelve late drop-outs were tested in 1983.

Non-academic drop-outs (n=11). Most of the non-academic drop-outs had left the French immersion program by the end of five-year-old Kindergarten (n=8). One child dropped out at the end of Grade three, and two at the end of Grade four. Eight non-academic drop-outs were tested in 1983.

The length of time spent in the French immersion program by the early, late and non-academic drop-outs is shown in table 5.

Table 5

Number of Months Spent in the French Immersion Program

(10 months = 1 school year)

No. months	Academic Drop-Outs	Non-Academic Drop-Outs
1		1
4		1
6	1	1
7		1
10	10	4
11	4	
15	1	
17	1	
20	6	
24	2	
34	1	
40	3	1
41	1	
48	1	
50	2	2
52	1	
	34	11

FRENCH IMMERSION GROUP VERSUS ACADEMIC DROP-OUTS

Descriptive Information

The 79 children who were in French immersion Grade five in the spring of 1983 and the 34 children considered to be academic drop-outs were compared in terms of sex, hand dominance, age, IQ and, family socioeconomic status. The results of these comparisons can be found in tables 6 and 7.

Significant sex differences were found between the French immersion and the drop-out groups. The proportion of males was higher in the drop-out group than in the French immersion group. No significant differences were found for hand dominance. The results of the Chi-square analyses of these two variables are found in table 6.

F-tests indicated significant differences between the two groups in terms of IQ scores and socioeconomic status. The French immersion success group scored higher than the drop-outs on Verbal, Performance and Full-Scale IQ as measured by the Wechsler Preschool and Primary Scale of Intelligence (WPPSI). The French immersion success group was also found to come from families of higher socioeconomic status than those of drop-outs. No age difference was found between the two groups. The results of these tests are shown in table 7.

Biographical and Background Information Questionnaire

Chi-square analyses were computed comparing the French immersion success group and the drop-out group on biographical data collected when the children were in four-year-old Kindergarten. No significant differences were found in terms of the proportion of mothers or fathers who spoke French, parents' desires to learn French, the proportion of fathers who had studied French after high school, whether or not the children heard French spoken at home or in their neighbourhood, the number of siblings in French immersion, or how often the children were read to by their parents.

Table 6

Sex and Hand Dominance Comparisons of French Immersion Subjects and Drop-Outs

	Sex				Dominance			
	M		F		Right		Left	
Group	#	%	#	%	#	%	#	%
French immersion (n=79)	31	39.2	48	60.8	74	93.7	5	6.3
Drop-outs (n=34)	21	61.8	13	38.2	28	82.4	6	17.6

$Chi^2 = 4.0$ $p < .05$ (df = 1)

$Chi^2 = 2.3$ $p > .05$ (NS) (df = 1)

NS = Not statistically significant

Table 7

Age, Verbal IQ, Performance IQ, Full Scale IQ, and Socioeconomic Status Comparisons of French Immersion Subjects and Drop-Outs

	French Immersion		Academic Drop-Outs		t	df	p
	X	SD	X	SD			
AGE	4.9	.3	4.9	.3	.1	111	.92
VIQ	124.0	10.7	111.7	11.5	5.5	111	.000
PIQ	119.8	10.5	108.4	9.5	5.5	111	.000
FSIQ	124.3	10.0	110.9	9.3	6.7	111	.000
SES Family	64.2	10.4	56.4	13.8	2.9	108	.006

Significant differences were found for three variables: whether or not the mother had taken a French course after high school; the number of books in the home; and nursery school attendance. The results of the Chi-square analyses of these variables are shown in table 8. Approximately half of the mothers of French immersion success children said they had taken a course in French after high school, compared to only one-quarter of the mothers of drop-outs. A greater proportion of drop-outs came from homes where there were fewer books. In the drop-out group, 36% came from homes where there were 100 or fewer books compared to only 15% of French immersion success children. A greater proportion of drop-outs had not attended nursery school. Whereas 61% of drop-outs had not attended nursery school, only 34% of French immersion success students had not gone to nursery school. It appears that certain aspects of the children's early educational background and home environment were predictive of future success or failure in the French immersion program.

Teachers' Advice Regarding French Immersion Enrolment

At the four- and five-year old Kindergarten levels and at the Grade one level, teachers were asked to indicate whether or not they felt French immersion was advisable for their pupils. Chi-square analyses were performed to compare the French immersion and drop-out groups on these variables, and the results are presented in table 9 for early drop-outs, table 10 for late drop-outs, and table 11 for all 34 academic drop-outs.

Table 8

Chi-Square Analyses Comparing the French Immersion Subjects and Drop-Outs in Terms of Whether or Not Mother Had Taken a Post-secondary Course in French, the Number of Books in the Home, and Nursery School Attendance

		French Immersion		All Academic Drop-Outs		One Sample Chi²
		#	%	#	%	
Has mother taken a French course?	Yes	38	48.2	9	27.3	2.55
	No	41	51.8	24	72.7	1.86
$Chi^2 = 3.87$ $p < .05$						
How many books do you have in your home?	0-100	12	15.1	12	36.4	4.80*
	101-500	34	43.1	12	36.4	.24
	over 500	33	41.8	9	27.2	1.32
$Chi^2 = 6.36$ $p < .05$						
Nursery school attendance	Yes	52	65.8	13	39.3	2.83
	No	27	34.2	20	60.7	4.00*
$Chi^2 = 6.83$ $p < .05$						

* = $p < .05$

Table 9

Chi-Square Analyses Comparing the French Immersion Subjects and Early Drop-Outs in Terms of Four-and Five-Year-Old Kindergarten Teachers' Advice Regarding French Immersion Enrolment

Four Year Old Kindergarten Teachers' Advice	French Immersion		Early Drop-Outs		One Sample
	#	%	#	%	Chi^2
Advised	53	86.9	6	42.9	2.8^{NS}
Not advised	8	13.1	8	57.1	10.2
	61		14		
Undecided	3		1		
Missing	15		2		
TOTAL	79		17		

$X^2 = 10.7$ (df = 1) $p < .01$

Four Year Old Kindergarten Teachers' Advice	French Immersion		Early Drop-Outs		One Sample
	#	%	#	%	Chi^2
Advised	76	97.4	7	50.0	3.0^{NS}
Not advised	2	2.6	7	50.0	27.3
	78		14		
Missing	1		2		
TOTAL	79		16		

$Chi^2 = 25.1$ (df = 1) $p < .001$

NS = Not statistically significant

Early drop-outs versus French immersion success. The Chi-square analyses were significant at both the four- and five-year-old Kindergarten levels (see table 9). One sample Chi-square tests indicated that both four- and five-year-old Kindergarten teachers advised against French immersion enrolment for a greater proportion of drop-outs than French immersion success subjects. No significant differences were found between the proportion of French immersion subjects and drop-outs for whom French immersion was advised by four- and five-year-old Kindergarten teachers.

The early drop-out group consisted of 17 drop-outs for the four-year-old Kindergarten analysis, and 16 drop-outs for the five-year-old Kindergarten analysis. One drop-out was removed from the latter analysis since he had dropped out before the end of the five-year-old Kindergarten school year. No analysis was done on the early drop-outs using the Grade one teachers' advice because most of the early drop-outs had already dropped out by the beginning of Grade one, and one would not expect the teachers to advise French immersion for these students.

Late drop-outs versus French immersion success. The Chi-square analyses indicated significant differences at all three grade levels (see table 10). Once again, there were no significant differences between the proportion of French immersion success students and drop-outs for whom French immersion was advised by four- and five-year old Kindergarten and Grade one teachers. However, French immersion was not advised for a significantly greater proportion of drop-outs than French immersion success subjects at all three grade levels.

All 34 academic drop-outs versus French immersion success. Chi-square analyses indicated significant differences at both the four- and five-year-old Kindergarten levels (see table 11). Four-year-old Kindergarten teachers advised French immersion enrolment for a greater proportion of French immersion success subjects than drop-outs, and advised against French immersion enrollment for a greater proportion of drop-outs than French immersion success subjects. At the five-year-old Kindergarten level, there was no significant difference in the proportion of French immersion success subjects and drop-outs for whom French immersion enrolment was advised; however, French immersion was not advised for a significantly greater proportion of drop-outs than French immersion success subjects.

The analysis at the five-year-old Kindergarten level excluded the one early drop-out who had left the French immersion program before the end of five-year-old Kindergarten. No analysis was done using the Grade one teachers' ratings, since many of the early drop-outs had already transferred out of the program, and teachers would not be expected to advise French immersion for these students.

Conclusions regarding teachers' advice. The advice of four- and five-year-old Kindergarten teachers was quite accurate in predicting those children who would be successful in the French immersion program, but was not useful in predicting those children who would drop out. Four-year-old Kindergarten teachers advised French immersion enrolment for 87% of students who were still successful in the program at the Grade five level. Five-year-old Kindergarten

teachers advised French immersion enrolment for 97% of successful students and Grade one teachers for 87% of successful students.

Although French immersion was not advised for a greater proportion of drop-outs than French immersion success students by four- and five-year-old Kindergarten teachers and Grade one teachers, four-year-old Kindergarten teachers advised French immersion for almost half of early drop-outs (43%) and late drop-outs (46%). Five-year-old Kindergarten teachers advised French immersion for half of early drop-outs (50%) and almost three-quarters of late drop-outs (71%). Grade one teachers advised French immersion for 43% of late drop-outs. These figures indicate that teacher ratings are not good predictors of those who will drop-out of French immersion. It seems that teachers tended to be more cautious about not advising French immersion than about advising it.

Table 10

Chi-Square Analyses Comparing the French Immersion Subjects and Late Drop-Outs in Terms of Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade One Teachers' Advice Regarding French Immersion Enrolment

Four Year Old Kindergarten Teachers' Advice	French Immersion		Late Drop-Outs		One Sample
	#	%	#	%	Chi^2
Advised	53	86.9	5	45.5	2.0^{NS}
Not advised	8	13.1	6	54.5	8.5 **
	61		11		
Undecided	3		0		
Missing	15		6		
TOTAL	79		17		

$Chi^2 = 7.7$ (df = 1) $p < .01$

Four Year Old Kindergarten Teachers' Advice	French Immersion		Late Drop-Outs		One Sample
	#	%	#	%	Chi^2
Advised	76	97.4	12	70.6	1.1^{NS}
Not advised	2	2.6	5	29.4	12.9 ***
	78		17		
Missing	1		0		
TOTAL	79		17		

$Chi^2 = 11.1$ (df = 1) $p < .001$

(Continued)

Table 10 (cont)

Grade One Teachers' Advice	French Immersion #	French Immersion %	Late Drop-Outs #	Late Drop-Outs %	One Sample Chi^2
Advised	66	86.8	6	42.9	2.8^{NS}
Not advised	10	13.2	8	57.1	11.4 **
	76		14		
Undecided	3		3		
TOTAL	79		17		

$Chi^2 = 11.7$ (df = 1) $p < .001$

** = $p < .01$

*** = $p < .001$

NS = Not statistically significant

Table 11

Chi-Square Analyses Comparing the French Immersion Subjects and All Academic Drop-Outs in Terms of Four-Year-Old Kindergarten and Five-Year-Old Kindergarten Teachers' Advice Regarding French Immersion Enrolment

Four Year Old Kindergarten Teachers' Advice	French Immersion #	French Immersion %	All 34 Academic Drop-Outs #	All 34 Academic Drop-Outs %	One Sample Chi^2
Advised	53	86.9	11	44.0	4.3 *
Not advised	8	13.1	14	56.0	10.7 **
	61		25		
Undecided	3		1		
Missing	15		8		
TOTAL	79		34		

$Chi^2 = 15.0$ (df = 1) $p < .001$

Four Year Old Kindergarten Teachers' Advice	French Immersion #	French Immersion %	33 Academic Drop-Outs #	33 Academic Drop-Outs %	One Sample Chi^2
Advised	76	97.4	19	61.3	3.3^{NS}
Not advised	2	2.6	12	38.7	22.4 ***
	78		31		
Missing	1		2		
TOTAL	79		33		

$Chi^2 = 22.8$ (df = 1) $p < .001$

* = $p < .05$

*** = $p < .001$

NS = Not statistically significant

Teacher Ratings

Chi-square analyses of four-year-old Kindergarten, five-year-old Kindergarten, and Grade one teacher ratings for the French immersion success and drop-out groups are presented in tables 12 to 18. At the four- and five-year-old Kindergarten levels, all 34 academic drop-outs were included in the analyses. At the Grade one level, only the 17 late drop-outs were included since the 17 early drop-outs had already left the French immersion program by that time.

Four-Year-Old Kindergarten Teacher Ratings. The French immersion success group and drop-out group were compared in terms of four-year-old Kindergarten teacher ratings of ability, social maturation, and motivation. The results of Chi-square analyses of these ratings are shown in table 12. Significant differences were found between the two groups on ratings of ability and motivation but not for social maturation, although even this approached significance. One-sample Chi-square tests indicated that there were no significant differences between the proportion of French immersion subjects and drop-outs rated below average or average, but that a significantly greater proportion of French immersion subjects than drop-outs were rated above average on motivation.

No significant differences were found between the French immersion group and early drop-outs on any of the three dimensions (see table 13).

There was a marginally significant difference between the French immersion group and late drop-outs on motivation. Although not significant, there was a tendency for a greater proportion of French immersion subjects as compared to late drop-outs to be rated above average on motivation (see table 14).

Table 12

Chi-Square Analyses Comparing the French Immersion Subjects and All Academic Drop-Outs in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation

Four-Year-Old Kindergarten Teacher Ratings	French Immersion		All Academic Drop-Outs		One-sample Chi^2
	#	%	#	%	
Ability					
Below average	1	1.3	2	5.9	1.9
Average	33	42.3	21	61.8	1.8
Above average	44	56.4	11	32.4	2.8
$Chi^2 = 6.5$ (df = 2) $p < .05$					
Social maturation					
Below average	14	17.9	6	17.6	-
Average	45	47.7	26	76.5	-
Above average	19	24.4	2	5.9	-
$Chi^2 = 5.6$ (df = 2) (NS)					
Motivation					
Below average	6	7.8	2	5.9	.4
Average	44	57.1	28	82.4	2.3
Above average	27	35.1	4	11.8	4.5*
$Chi^2 = 7.0$ (df = 2) $p < .05$					

NS = Not statistically significant ($p > .05$)

* = $p < .05$

58

Table 13

Chi-Square Analyses Comparing French Immersion Subjects and Early Drop-Outs in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation

Four-Year-Old Kindergarten Teacher Ratings	French Immersion		Early Academic Drop-Outs	
	#	%	#	%
Ability				
Below average	1	1.3	1	5.9
Average	33	42.3	11	64.7
Above average	44	56.4	5	29.4
$Chi^2 = 4.9$ (df = 2) (NS)				
Social maturation				
Below average	14	17.9	2	11.8
Average	45	57.7	14	82.4
Above average	19	24.4	1	5.9
$Chi^2 = 3.9$ (df = 2) (NS)				
Motivation				
Below average	6	7.8	2	11.8
Average	44	57.1	13	76.5
Above average	27	35.1	2	11.8
$Chi^2 = 3.6$ (df = 2) (NS)				

NS = Not statistically significant ($p > .05$)

Table 14

Chi-Square Analyses Comparing the French Immersion Subjects and Late Drop-Outs in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation

Four-Year-Old Kindergarten Teacher Ratings	French Immersion		Late Academic Drop-Outs		One-sample Chi^2
	#	%	#	%	
Ability					
Below average	1	1.3	1	5.9	-
Average	33	42.3	10	58.8	-
Above average	44	56.4	6	35.3	-
$Chi^2 = 3.4$ (df = 2) (NS)					
Social maturation					
Below average	14	17.9	4	23.5	-
Average	45	57.7	12	70.6	-
Above average	19	24.4	1	5.9	-
$Chi^2 = 2.9$ (df = 2) (NS)					
Motivation					
Below average	6	7.8	0	0	1.3
Average	44	57.1	15	88.2	2.1
Above average	27	35.1	2	11.8	2.4
$Chi^2 = 5.9$ (df = 2) $p > .05$ (marginally significant)					

NS = Not statistically significant ($p > .05$)

Table 15

Chi-Square Analyses Comparing the French Immersion Subjects and All Academic Drop-Outs in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level

Five-Year-Old Kindergarten Teacher Ratings	French Immersion		Drop-Outs		One-sample Chi^2
	#	%	#	%	
Comprehension of French					
Below average	2	2.5	12	38.7	22.9***
Average	41	51.9	15	48.4	.1
Above average	36	45.6	4	12.9	6.5*
$Chi^2 = 29.5$ (df = 2) $p < .001$					
French oral skills					
Below average	4	5.1	16	51.6	26.5***
Average	41	51.9	11	35.5	1.2
Above average	34	43.0	4	12.9	5.9*
$Chi^2 = 33.6$ (df = 2) $p < .001$					
Functioning level					
Early Kindergarten	1	1.3	4	12.5	6.4*
Mid-Kindergarten	22	27.8	12	37.5	.7
Ready for Grade 1	56	70.9	16	50.0	1.5
$Chi^2 = 8.6$ (df = 2) $p < .05$					

* = $p < .05$

*** = $p < .001$

Table 16

Chi-Square Analyses Comparing the French Immersion Subjects and Early Drop-Outs in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level

Four-Year-Old Kindergarten Teacher Ratings	French Immersion		Early Academic Drop-Outs		One-sample Chi²
	#	%	#	%	
Comprehension of French					
Below average	2	2.5	6	42.9	15.8***
Average	41	51.9	7	50.0	0
Above average	36	45.6	1	7.1	4.5*
$Chi^2 = 26.9$ (df = 2) $p < .001$					
French oral skills					
Below average	4	5.1	9	64.3	29.0***
Average	41	51.9	4	28.6	1.3
Above average	34	43.0	1	7.1	4.0*
$Chi^2 = 35.2$ (df = 2) $p < .001$					
Functioning level					
Early Kindergarten	1	1.3	0	0.0	-
Mid-Kindergarten	22	27.8	8	53.3	-
Ready for Grade 1	56	70.9	7	46.7	-
$Chi^2 = 3.9$ (df = 2) (NS)					

* = $p < .05$

*** = $p < .001$

NS = Not statistically significant ($p > .05$)

Table 17

Chi-Square Analyses Comparing the French Immersion Subjects and Late Drop-Outs in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level

Five-Year-Old Kindergarten Teacher Ratings	French Immersion		Late Academic Drop-Outs		One-sample Chi²
	#	%	#	%	
Comprehension of French					
Below average	2	2.5	6	35.3	18.3***
Average	41	51.9	8	41.1	.1
Above average	36	45.6	3	17.6	2.7
$Chi^2 = 20.8$ (df = 2) $p < .001$					
French oral skills					
Below Average	4	5.1	7	41.2	16.6***
Average	41	51.9	7	41.2	.4
Above average	34	43.0	3	17.6	2.4
$Chi^2 = 18.6$ (df = 2) $p < .001$					
Functioning level					
Early Kindergarten	1	1.3	4	23.5	13.0***
Mid-Kindergarten	22	27.8	4	23.5	.1
Ready for Grade 1	56	70.9	9	52.9	.6
$Chi^2 = 14.1$ (df = 2) $p < .001$					

*** = $p < .001$

Table 18

Chi-Square Analyses Comparing the French Immersion Subjects and Late Academic Drop-Outs in Terms of Grade One Teacher Ratings of Comprehension of French, French Oral Skills, Reading Skills in French, Confidence and Willingness in French, and Present Functioning Level

Grade 1 Teacher Ratings	French Immersion #	French Immersion %	Late Academic Drop-Outs #	Late Academic Drop-Outs %	One-Sample Chi²
Comprehension of French					
Below average	2	2.5	2	11.8	2.9
Average	42	53.2	14	82.4	2.1
Above average	35	57.1	1	5.9	5.6*
$Chi^2 = 10.4$ (df = 2) $p < .01$					
French oral skills					
Below average	1	1.3	4	23.5	13.0***
Average	53	67.1	12	70.6	0
Above average	25	31.6	1	5.9	3.4
$Chi^2 = 16.8$ (df = 2) $p < .001$					
Reading skills in French					
Below average	4	5.1	2	12.5	-
Average	44	55.7	12	75.0	-
Above average	31	39.2	2	12.5	-
$Chi^2 = 4.7$ (df = 2) (NS)					
Confidence and willingness in French:					
Below average	2	2.5	4	23.5	9.3**
Average	52	65.8	10	58.8	.1
Above average	25	31.6	3	17.6	1.0
$Chi^2 = 10.9$ (df = 2) $p < .01$					
Present functioning level					
Early Grade 1	0	0.0	1	5.9	3.8*
Mid-Grade 1	10	12.7	8	47.1	8.8**
Ready for Grade 2	69	87.3	8	47.1	2.8
$Chi^2 = 16.3$ (df = 2) $p < .001$					

NS = Not statistically significant ($p > .05$)

* = $p < .05$

** = $p < .01$

*** = $p < .001$

Five-Year-Old Kindergarten Teacher Ratings. Five-year-old kindergarten teachers rated the French immersion group and drop-outs on comprehension of French, French oral skills, and their overall functioning grade level. Significant Chi-square differences were found between the two groups on all three of these variables. One-sample Chi-square tests indicated that a greater proportion of drop-outs than French immersion subjects were rated below average on comprehension of French and French oral skills, and that a greater proportion of French immersion success subjects were rated above average on these same variables. There was no significant difference between the proportion of the two groups who were rated average. In terms of functioning level, a greater proportion of drop-outs than French immersion subjects were rated as being at the early Kindergarten functioning level (see table 15).

Approximately 70% of the French immersion group were rated as being ready for Grade one at the end of five-year-old Kindergarten. Fifty percent of drop-outs were rated as being ready for Grade one, indicating that one-half of the children who were to drop out of French immersion were experiencing difficulties at the end of five-year-old Kindergarten.

Significant differences were found between the French immersion group and early drop-outs on comprehension of French and French oral skills (table 16). A greater proportion of early drop-outs were rated below average on these dimensions than were French immersion subjects, and a greater proportion of French immersion success subjects were rated above average on these dimensions than were drop-outs.

Significant differences were found between the French immersion success group and late drop-outs on all three dimensions. A greater proportion of late drop-outs compared to French immersion success subjects were rated below average on comprehension of French and French oral skills. Also, a greater proportion of late drop-outs were said to be at the early Kindergarten level compared to the French immersion subjects (see table 17).

Grade One Teacher Ratings. Grade one teachers rated the French immersion group and drop-outs on comprehension of French, French oral skills, reading skills in French, confidence and willingness in French, and functioning level. Chi-square analyses were significant for four of these five variables. A greater proportion of French immersion subjects in relation to drop-outs were rated above average on comprehension of French. A greater proportion of drop-outs to French subjects were rated below average on French oral skills and confidence and willingness in French. There were no significant differences in the ratings of French immersion subjects and drop-outs on reading skills in French (see table 18).

A greater proportion of drop-outs to French immersion subjects were rated as being at the early Grade one level or at the mid-Grade-one level. Eighty-seven percent of French immersion subjects were rated as being ready for Grade two compared to only 47% of drop-outs. This indicates that over 50% of children who were to drop out of French immersion were experiencing academic problems in the program at the end of Grade one.

1983 Teacher Ratings. In order to compare the progress of French immersion students and the 1983 drop-outs in English language skills, the ratings done by their English teachers at the 1983 testing were subjected to Chi-square analyses.

A significant difference was found between the groups in English spelling skills. A greater proportion of drop-outs were rated below average on this dimension than were French immersion subjects. No significant differences were found between the two groups on ratings on comprehension of English, oral skills in English, reading skills in English, willingness and confidence in English, or functioning level (see table 19).

French immersion students are taught arithmetic in French by their French immersion teacher. The ratings of the French immersion teachers and English teachers on arithmetic were compared for the French immersion and drop-out groups. No significant differences were found.

The results of these teacher ratings are interesting when compared to the scores obtained by the two groups on achievement measures at the 1983 testing. T-tests performed between the groups on these measures indicated that the French immersion group scored significantly higher on reading, spelling, and arithmetic skills (as measured by the WRAT) and on receptive and reading vocabulary (as measured by the Peabody Picture Vocabulary Test) (see table 35). This apparent discrepancy between teacher ratings and objective test scores can be explained by the fact that whereas objective tests by their nature have a single standard by which to measure achievement, teachers were more likely to compare each student only with the other students in their class. Therefore the teacher ratings can be interpreted to mean that most children in both the French immersion group and the drop-out group were performing at least at an average level compared to the rest of their class. The only exception was for spelling skills, where one half of the drop-outs were performing at a below average level.

Difficulty and Special Help in School

Four- and five-year-old Kindergarten and Grade one teachers were asked to indicate those children who were having difficulty and those who received special help in school at these three grade levels.

Difficulty in School. At the four-year-old Kindergarten level, Chi-square analyses did not show a significant difference between the proportion of French immersion subjects and drop-outs who experienced difficulty in school (see table 20).

Table 19

Chi-Square Analyses Comparing the French Immersion Subjects and 1983 Drop-Outs in Terms of Grade Five Teacher Ratings of Comprehension of English, Oral Skills in English, Reading Skills in English, Spelling Skills in English, Willingness and Confidence in English, Arithmetic Skills, and Functioning Level

Grade 5 Teacher Ratings	French Immersion		1983 Drop-Outs	
	#	%	#	%
Comprehension of English				
Below average	6	7.8	4	25.0
Average	38	50.0	8	50.0
Above average	32	42.2	4	25.0
$Chi^2 = 4.7$ (df = 2) (NS)				
Oral skills in English				
Below average	6	7.8	2	12.5
Average	45	59.3	8	50.0
Above average	25	32.9	6	37.5
$Chi^2 = .7$ (df = 2) (NS)				
Reading skills in English				
Below average	10	13.2	3	18.8
Average	33	43.4	7	43.8
Above average	33	43.4	6	37.4
$Chi^2 = .4$ (df = 2) (NS)				
Spelling skills in English				
Below average	15	19.7	8	50.0
Average	36	47.4	4	25.0
Above average	25	32.9	4	25.0
$Chi^2 = 6.6$ (df = 2) $p < .05$				

(Continued)

Table 19 (cont)

Grade 5 Teacher Ratings	French Immersion		1983 Drop-Outs	
	#	%	#	%
Willingness and confidence in English language				
Below average	10	13.2	2	12.5
Average	32	42.1	9	56.3
Above average	34	44.7	5	31.2
$Chi^2 = 1.2$ (df = 2) (NS)				
Arithmetic skills	(French teacher)		(English teacher)	
Below average	7	9.7	4	25.0
Average	42	58.3	7	43.8
Above average	23	32.0	5	31.2
$Chi^2 = 2.9$ (df = 2) (NS)				
Present functioning level				
Below average	10	15.2	4	25.0
Average	33	50.0	9	56.3
Above average	23	34.8	3	18.7
$Chi^2 = 2.0$ (df = 2) (NS)				

NS = Not statistically significant ($p > .05$)

Table 20

Chi-Square Analyses Comparing the French Immersion Subjects With Early Drop-Outs, Late Drop-Outs, and All Drop-Outs Combined and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Difficulty in Four-Year-Old Kindergarten as Reported by Teachers

Difficulty in 4-Year-Old Kindergarten	French Immersion		Early Drop-Outs	
	#	%	#	%
Yes	9	12.9	5	31.2
No	61	87.1	11	68.8

Chi^2 3.2 = (df = 1) (NS)

	French Immersion		Late Drop Outs	
	#	%	#	%
Yes	9	12.9	3	23.1
No	61	87.1	10	76.9

Chi^2 = .8 (df = 1) (NS)

	French Immersion		All Drop-Outs	
	#	%	#	%
Yes	9	12.9	8	27.6
No	61	87.1	21	72.4

Chi^2 = 2.2 (df = 1) (NS)

	French Immersion		Late Drop-Outs	
	#	%	#	%
Yes	5	31.2	3	23.1
No	11	68.8	10	76.9

Chi^2 = .2 (df = 1) (NS)

NS = Not statistically significant ($p > .05$)

At the five-year-old Kindergarten level significant differences were found. The proportion of drop-outs who were said to be experiencing difficulties was significantly greater than the proportion of French immersion subjects. This same difference was reflected for the early drop-outs but not for the late drop-outs. When early and late drop-outs were compared, a marginally significant difference was found, indicating that more early drop-outs than late drop-outs were experiencing difficulties at the end of five-year-old Kindergarten (see table 21).

At the end of Grade one, a greater proportion of drop-outs than French immersion subjects were said to be experiencing difficulties. This difference was reflected in both the early and late drop-out groups. Interestingly, the same percentage (65%) of both early and late drop-outs were reported to be experiencing difficulties (see table 22).

Special Help in School. At the five-year-old Kindergarten level, a greater proportion of drop-outs than French immersion subjects were said to be receiving special help in school. This same difference was found for both early and late drop-outs. No differences were found between the early and late drop-outs (see table 23).

At the Grade one level, a greater proportion of drop-outs than French immersion subjects were said to be receiving special help in school. This same difference was found for the early drop-out group, but not for the late drop-outs. It appears that the difficulties experienced by the late drop-outs at the end of Grade one were in many cases not serious enough to require special help, whereas those of most early drop-outs were (see table 24).

Table 21

Chi-Square Analyses Comparing the French Immersion Subjects With Early Drop-Outs, Late Drop-Outs, and All Drop-Outs Combined and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Difficulty in Five-Year-Old Kindergarten as Reported by Teachers

Difficulty in 5-Year-Old Kindergarten	French Immersion		Early Academic Drop-Outs	
	#	%	#	%
Yes	22	27.8	13	86.7
No	57	72.2	2	13.3

$Chi^2 = 16.2$ (df = 1) $p < .001$

	French Immersion		Late Academic Drop-Outs	
	#	%	#	%
Yes	22	27.8	9	52.9
No	57	72.2	8	47.1

$Chi^2 = 3.0$ (df = 1) (NS)

	French Immersion		All Academic Drop-Outs	
	#	%	#	%
Yes	22	27.8	22	68.8
No	57	72.2	10	31.2

$Chi^2 = 14.3$ (df = 1) $p < .001$

	Early Drop-Outs		Late Drop-Outs	
	#	%	#	%
Yes	13	86.7	9	52.9
No	2	13.3	8	47.1

$Chi^2 = 2.8$ (df = 1) (NS)

NS = Not statistically significant ($p > .05$)

Table 22

Chi-Square Analyses Comparing French Immersion Subjects With Early Drop-Outs, Late Drop-Outs, and All Drop-Outs Combined, and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Difficulty in Grade One as Reported by Teachers

Difficulty in Grade One	French Immersion		Early Academic Drop-Outs	
	#	%	#	%
Yes	21	26.6	11	64.7
No	58	73.4	6	35.5

$Chi^2 = 7.5$ (df = 1) $p < .01$

	French Immersion		Late Academic Drop-Outs	
	#	%	#	%
Yes	21	26.6	11	64.7
No	58	73.4	6	35.3

$Chi^2 = 7.5$ (df = 1) $p < .01$

	French Immersion		All Academic Drop-Outs	
	#	%	#	%
Yes	21	26.6	22	64.7
No	58	73.4	12	35.3

Chi^2 = (df = 1) $p < .01$

	Early Drop-Outs		Late Drop-Outs	
	#	%	#	%
Yes	11	64.7	11	64.7
No	6	35.3	6	35.3

$Chi^2 = 0$ (df = 1) (NS)

NS = Not statistically significant ($p > .05$)

72

Table 23

Chi-Square Analyses Comparing the French Immersion Subjects With Early Drop-Outs, Late Drop-Outs, and All Drop-Outs Combined and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Special Help Received in Five-Year-Old Kindergarten as Reported by Teachers

Special Help in Five-Year-Old Kindergarten	French Immersion		Early Academic Drop-Outs	
	#	%	#	%
Yes	13	16.5	11	73.3
No	66	83.5	4	26.7

$Chi^2 = 18.6$ (df = 1) $p<.001$

	French Immersion		Late Academic Drop-Outs	
	#	%	#	%
Yes	13	16.5	8	47.1
No	66	83.5	9	52.9

$Chi^2 = 6.0$ (df = 1) $p <.05$

	French Immersion		All Academic Drop-Outs	
	#	%	#	%
Yes	13	16.5	19	59.4
No	66	83.5	13	40.6

$Chi^2 = 18.4$ (df = 1) $p <.001$

	Early Academic Drop-Outs		Late Academic Drop-Outs	
	#	%	#	%
Yes	11	73.3	8	47.1
No	4	26.7	9	52.9

$Chi^2 = 1.3$ (df = 1) (NS)

NS = Not statistically significant ($p >.05$)

Table 24

Chi-Square Analyses Comparing the French Immersion Subjects With Early Drop-Outs, Late Drop-Outs, and All Drop-Outs Combined and Comparing Early Drop-Outs with Late Drop-Outs in Terms of Special Help Received in Grade One as Reported by Teachers

Special Help in Grade One	French Immersion		Early Academic Drop-Outs	
	#	%	#	%
Yes	14	17.9	9	52.9
No	64	82.1	8	47.1

Chi = 7.5 (df = 1) $p < .01$

	French Immersion		Late Academic Drop-Outs	
	#	%	#	%
Yes	14	17.9	6	35.3
No	64	82.1	11	64.7

Chi^2 = 1.6 (df = 1) (NS)

	French Immersion		All Academic Drop-Outs	
	#	%	#	%
Yes	14	17.9	15	44.1
No	64	82.1	19	55.9

Chi^2 = 6.5 (df = 1) p□ .05

	Early Academic Drop-Outs		Late Academic Drop-Outs	
	#	%	#	%
Yes	9	52.9	6	35.3
No	8	47.1	11	64.7

Chi^2 = .5 (df = 1) (NS)

NS = Not statistically significant

Connors Teacher Ratings

The French immersion success group and the academic drop-out group were compared in terms of their percentage scores on the Connors Teacher Rating Scale. The children were rated by their teachers at the end of four-year-old Kindergarten, five-year-old Kindergarten, Grade one, Grade four, and Grade five. The mean percentage scores and standard deviations for the groups are given in Appendix VIII. The results of significant t-tests are shown in tables 31 to 35.

The inattentive-passive dimension differentiated between the two groups at the four- and five-year-old Kindergarten, Grade one, and Grade five levels. Drop-outs scored significantly higher on this dimension, indicating more inattentive-passive behaviour, than did French immersion subjects.

Drop-outs also scored significantly higher than French immersion subjects on the hyperactivity dimension at the four- and five-year-old Kindergarten and Grade four levels.

Problem Areas Reported by Teachers and Parents

French immersion teachers, English teachers, and parents were asked at the 1983 testing to identify any areas in which a child was experiencing difficulty. These problem areas are given in table 25, broken down according to group (French immersion, early drop-outs, late drop-outs).

Early Drop-Outs (n=6). All parents of early drop-outs returned the questionnaire, and 5 of the 6 English teachers returned the questionnaires. The English teachers reported problems for 2 of the 5 early drop-outs: one child was weak in oral English and another child was said to be disorganized and inattentive. Parents reported problems for 3 of the 6 early drop-outs: one child was said to be weak in arithmetic, and two others in general English language development.

Table 25

Areas in Which French Immersion Subjects and Drop-Outs were Experiencing Difficulty at the 1983 Testing as Reported by French Immersion Teachers, English Teachers, and Parents

	Reported by		
Area of Difficulty	French Immersion Teacher	English Teacher	Parents
MATH	7(FI)	3(L)	8(FI), 1(E), 5(L)
FRENCH SKILLS:			
Spelling	4(FI)		4(FI)
Oral French	2(FI)		
Comprehension	2(FI)		
Writing	4(FI)		
Grammar	2(FI)		
Reading	3(FI)		
Literature	2(FI)		
ENGLISH SKILLS:			
Spelling		1(FI), 2(L)	3(FI), 1(L)
Oral English		3(FI), 1(E)	1(FI)
Reading		2(FI), 1(E)	3(FI), 3(L)
Writing		3(FI)	
General		1(L)	2(E)
OTHER ACADEMIC SKILLS:			
Concentration/Attention	6(FI)	1(FI), 1(E)	1(FI)
Work habits	7(FI)	4(FI), 3(L), 1(E)	2(E), 2(FI)
Reading (General)		2(L)	3(FI), 3(L)
Handwriting		1(FI)	1(L)
Dictation			1(E)
Research		1(L)	1(FI)
SOCIAL SKILLS	1(FI)	1(FI), 1(L)	
SELF CONFIDENCE	3(FI)	1(FI)	

(Continued)

Table 25 (cont)

Area of Difficulty	Reported by: French Immersion Teacher	Reported by: English Teacher	Reported by: Parents
RESPONSIBILITY	1(FI)	2(FI), 1(L)	1(L)
MOTIVATION	3(FI)		1(FI)
UNSPECIFIED DIFFICULTIES			1(FI)
	47(FI)	19(FI)	28(FI)
		4(E)	6(E)
		14(L)	14(L)

FI = French immersion subjects
E = Early academic drop-outs
L = Late academic drop-outs

Late Drop-Outs (n=12). Eleven parents returned the questionnaire, as did eleven English teachers. English teachers reported problems for 7 of the 11 late drop-outs. The most frequently reported problem areas were math (3) and work habits (3), followed by English spelling (2) and reading in general (2). Parents reported problems for 6 of the 11 late drop-outs. Again the most frequently cited problem area was math (5) followed by English reading (3), and reading in general (3).

French Immersion Success (n=79). Seventy-one parents returned the questionnaire as did 77 French immersion teachers and 78 English teachers. French teachers reported problems for 24 of the 77 French immersion students. The most frequently reported problem areas were math (7), work habits (7), concentration/attention (6), spelling in French (4), and writing in French (4). When grouped together, concerns about various French language skills were most frequently cited (19).

English teachers reported problems for 15 of the 78 French immersion students. The most frequently cited problem areas were work habits (4), written English (3), oral English (3) reading comprehension (2), English reading (2), and responsibility (2). When grouped together, concerns about various English language skills were most frequently cited (9).

Parents reported problems for 18 of the 71 French immersion students. The most frequently cited problem area was math (8), followed by French spelling (4), English spelling (3), English reading (3), reading in general (3), and work habits (2).

Parents' Original Reasons for Enrolling Children in French Immersion

Parents' original reasons for enrolling their children in French immersion were obtained by questionnaire when the children were in four-year-old Kindergarten. These reasons were classified into eleven categories and up to three responses were recorded for each case. The frequency of occurrence of each reason is shown in table 26 for the French immersion subjects and drop-outs.

The reason most frequently cited overall was number 1 (opportunity to learn to speak French; to have proficiency in Canada's two official languages) (60%) followed by numbers 2 (most painless and efficient way to teach a child a language) (16%), 5 (increase future employment opportunities) (7%), and 11 (general betterment of education) (7%).

This same basic pattern was followed for both the French immersion group and the drop-out group. The most frequently cited reasons given for the French immersion group were numbers 1 (57%), 2 (17%), 11 (9%), and 5 (8%). The most frequently given reasons for the drop-out group were numbers 1 (64%), 2 (15%), 5 (6%), and 6 (increase understanding of other cultural groups) (6%). On the whole, most groups showed an integrative orientation toward the learning of French, although an instrumental reason (increasing future employment opportunities) was also cited quite frequently.

Parent Questionnaire

Parents were asked at the 1983 testing to complete a questionnaire concerning their child's academic progress. The results of this questionnaire are shown in table 27.

French immersion subjects. The greatest amount of dissatisfaction among parents of children in French immersion was expressed for spelling in English (22%), followed by writing in English (18%), spelling in French (15%), writing in French (11%), and arithmetic (10%). Nineteen percent of parents felt their child was not receiving sufficient challenge in French immersion.

Table 26

Frequency of Occurrence of 11 Categories of Parents' Original Reasons for Enrolling Children in French Immersion for the French Immersion and Drop-Out Groups

Parents' Original Reasons For Enrolling Children in French Immersion	French Immersion	Drop-Outs			Total
		Early	Late	Total	
1. Opportunity to learn to speak French; to have proficiency in Canada's two official languages	45 (57.0%)	10 (58.8%)	11 (68.8%)	21 (63.6%)	66 (58.9%)
2. Most painless and efficient way to teach a child a language; the younger the better for teaching a child to speak comfortably and well	13 (16.5%)	3 (17.6%)	2 (12.5%)	5 (15.2%)	18 (16.1%)
3. Very positive attitude of child: (interested, eager, enthusiastic)	2 (2.5%)	0	1 (6.3%)	1 (3.0%)	3 (2.7%)
4. Availability of program in local school (no English Kindergarten)	1 (1.3%)	0	0	0	1 (.9%)
5. Increase future employment opportunities	6 (7.6%)	1 (5.9%)	1 (6.3%)	2 (6.1%)	8 (7.1%)
6. Increase understanding of other cultural groups	1 (1.3%)	2 (11.8%)	0	2 (6.1%)	3 (2.7%)
7. Child enjoys school and is having no problems	1 (1.3%)	0	0	0	1 (.9%)
8. Program is a challenge and should help prevent boredom in the second Kindergarten year	2 (2.5%)	0	0	0	2 (1.8%)

(Continued)

Table 26 (cont)

Parents' Original Reasons For Enrolling Children in French Immersion	French Immersion	Drop-Outs Early	Drop-Outs Late	Drop-Outs Total	Total
9. Communication enrichment (All language skills will be improved)	1 (1.3%)	0	0	0	1 (.9%)
10. Good experience with French immersion of siblings or friends	0	0	1 (6.3%)	1 (3.0%)	1 (.9%)
11. General betterment of education (any second language is of value)	7 (8.9%)	1 (5.9%)	0	1 (3.0%)	8 (7.1%)

Table 27

Parents' Responses to the Parent Questionnaire
for the French Immersion and Drop-Out Groups

		French Immersion	Drop-Outs		
			Early (n=6)	Late (n=12)	Total (n=18)
1. Do you plan to enrol your child in the late immersion program?	YES	N/A	0	2	2
	NO	N/A	5	9	14
2. Are you presently satisfied with your child's progress in the following area?					
- Speaking French	YES	61	4	8	12
	NO	5	2	1	3
- Reading French	YES	60	4	8	12
	NO	6	2	1	3
- Spelling in French	YES	54	3	6	9
	NO	12	3	3	6
- Writing in French	YES	57	3	6	9
	NO	9	3	3	6
- Speaking English	YES	66	5	9	14
	NO	1	1	1	2
- Reading English	YES	63	5	7	12
	NO	4	1	3	4
- Spelling in English	YES	50	4	8	10
	NO	17	2	2	4
- Writing in English	YES	50	3	7	10
	NO	14	2	1	3
- Arithmetic	YES	59	5	8	13
	NO	8	1	2	3
- Social skills	YES	65	5	9	14
	NO	2	1	1	2

(Continued)

Table 27 (cont)

		French Immersion	Drop-Outs		
			Early (n=6)	Late (n=12)	Total (n=18)
3. Do you feel that your child is receiving sufficient challenge/enrichment in his/her school program?	YES	50	5	7	10
	NO	15	1	3	4
4. Did child receive any tutoring outside of school this past year?	YES	9	2	4	6
	NO	60	4	7	11
5. Who did the tutoring?					
Parent		7	1	4	5
Brother/sister		1			
Hired tutor		1	1	0	1
6. Approximately how much time was spent in tutoring?					
Less than ½ hour per day		1	0	1	1
½ to 1 hour per day		6	2	2	4
More than 1 hour per day		2	0	1	1
7. How did your child react to this extra tutoring?					
Negatively		2	0	1	1
Positively		6	2	3	5
8. Did you feel that the tutoring was necessary for your child to keep up with the rest of the class?					
	YES	3	1	3	4
	NO	4	1	1	2

Nine children were being tutored outside of school hours; 7 by their parents, 1 by a sibling, and 1 by a hired tutor. Two were receiving less than 1/2 hour of instruction per day, 6 were receiving 1/2 to 1 hour per day, and 1 was receiving more than 1 hour per day. Six of the children were being tutored in math, 2 in reading, 2 in spelling, 1 in French grammar, 2 in research skills, and 1 in dictation. When asked how their child reacted to the extra tutoring, 6 parents said that their child reacted positively, 2 said their child reacted negatively, and 1 did not answer the question. Three parents felt the tutoring was necessary in order for their child to keep up with the rest of the class, 4 felt it was not necessary, and 2 did not answer the question.

Drop-Outs. When asked if they planned to enrol their child in late immersion, 5 of the 6 parents of early drop-outs answered no and 1 was uncertain, and 9 of the 12 parents of late drop-outs answered no, 2 answered yes and 1 was uncertain.

The greatest amount of dissatisfaction among parents of children who had dropped out of French immersion was expressed in the areas of spelling and writing in French (33%) followed by reading and spelling in English (22%). Twenty-two percent of parents of drop-outs felt their child was not receiving sufficient challenge or enrichment in his or her present school program.

Six drop-outs were being tutored outside of school hours; 5 by their parents, and 1 by a hired tutor. One was receiving less than 1/2 hour of tutoring per day, 4 were receiving 1/2 to 1 hour per day, and 1 was receiving more than 1 hour per day. Five of the children were being tutored in math, 3 in reading, 1 in handwriting, and 1 in translation. One child was reported to have reacted negatively to the tutoring. Parents of 4 of the 6 children felt that the tutoring was necessary in order for their child to keep up with the rest of the class.

Parents' Concerns About the French Immersion Program

Parents were asked in the Parent Questionnaire to express their concerns about the French immersion program. Parents of 30 children reported concerns, and these are shown in table 28 for the French immersion group and the drop-out group.

The most frequently cited concerns among parents of French immersion students were quality of English skills at present (15%) and quality of English skills at outcome (9%). The most frequent concerns among parents of drop-outs was the need for better screening methods (43%).

Connors Parent Ratings

Parents of children in the French immersion and drop-out groups rated the children on the Connors Parent Rating Scale at the 1982 and 1983 testings. The mean percentage scores for the two groups on all the subscales on the Connors can be found in Appendix VIII. No significant differences were found between the two groups on any of the subscales.

Repeating Grades and French Immersion

By the end of the 1983 school year, only two of the children still enrolled in the French immersion program were known to have repeated a grade. One had repeated Grade three and the other had repeated Grade four. In the early drop-out group, 1 of the 17 students had repeated a grade. This child had stayed in the program until the end of Grade one, then transferred to the English program and repeated Grade one. Three other early drop-outs were identified as requiring special education. All of these children spent only one year in French immersion (five-year-old Kindergarten), then transferred to the English program for Grade one. Consequently, 1 student went into special education after Grade one, and 1 after Grade two. The other student repeated Grade two, then was placed in special education.

Table 28

Concerns About the French Immersion Program Reported
by Parents of Children in the French Immersion and Drop-Out Groups

	French Immersion	Drop-Outs			Total
		Early	Late	Total	
1. Quality of English skills at present	5 (14.7%)	-	-	-	5 (12.2%)
2. Quality of English skills at outcome	3 (8.8%)	-	-	-	3 (7.3%)
3. Quality of French skills at present	1 (2.9%)	1 (20.0%)	-	1 (14.3%)	2 (4.9%)
4. Quality of French skills at outcome	1 (2.9%)	-	-	-	1 (2.4%)
5. Level of education at outcome	1 (2.9%)	-	-	-	1 (2.4%)
6. More English teaching needed	1 (2.9%)	-	-	-	1 (2.4%)
7. More English as a subject should be taught	2 (5.9%)	-	-	-	2 (4.9%)
8. More math needed	2 (5.9%)	-	-	-	2 (4.9%)
9. Development of math logic	1 (2.9%)	-	-	-	1 (2.4%)
10. Quality of science teaching	1 (2.9%)	-	-	-	1 (2.4%)
11. More science needed	2 (5.9%)	-	-	-	2 (4.9%)
12. Quality of English teachers	2 (5.9%)	-	-	-	2 (4.9%)
13. Quality of French teachers	1 (2.9%)	-	-	-	1 (2.4%)

(Continued)

Table 28 (cont)

	French Immersion	Drop-Outs Early	Drop-Outs Late	Drop-Outs Total	Total
14. Lack of enrichment opportunities in French immersion	2 (5.9%)	-	-	-	2 (4.9%)
15. Better screening methods needed	-	2 (40.9%)	1 (50.0%)	3 (42.9%)	3 (7.3%)
16. French immersion is geared toward toward a select group of children	-	1 (20.0%)	-	1 (14.3%)	1 (2.4%)
17. French immersion is stressful for children	1 (2.9%)	-	1 (50.0%)	1 (14.3%)	2 (4.9%)
18. Difficult for parents to assess progress	1 (2.9%)	-	-	-	-
19. Should be more homework	1 (2.9%)	-	-	-	-
20. Classes are too large	1 (2.9%)	-	-	-	-
21. How long should child stay in French immersion?	1 (2.9%)	-	-	-	-
22. Lack of good resource materials	1 (2.9%)	-	-	-	-
23. French reading material is too hard	1 (2.9%)	-	-	-	-
24. Not enough individual attention	1 (2.9%)	-	-	-	-
25. Class atmosphere is too "dictatorial"	1 (2.9%)	-	-	-	-
26. Not good for my child	-	1 (20.0%)		1 (14.3%)	1 (2.4%)
TOTAL	34	5	2	7	41

In the late drop-out group, 7 of the 17 students had repeated a grade. One had repeated five-year-old Kindergarten in French immersion, then transferred to the English program for Grade one. Three had attended Grade one French immersion, then repeated Grade one in English. One repeated Grade two in French immersion, then transferred to the English program for Grade three. One transferred to the English program after Grade three French immersion and had to repeat Grade three in English. One transferred after Grade four French immersion and had to repeat Grade four in English.

Children who dropped out of French immersion early were less likely to have to repeat a grade than were those who remained in the program for a longer period of time. This is likely due to the fact that there is no English instruction in the early grades in French immersion, and the children who remained in the program after Grade one had missed learning many basic English skills, making it necessary for many of them to repeat a grade in the English program.

Subject Questions

Responses to Subject Questionnaire. Subjects were asked various questions by the examiners about school, the French immersion program, and their use of French in and out of school. Their responses are shown in table 29 for the French immersion group and the drop-out group. Although the questionnaire was not completed by all members of the French immersion group, the percentage for this group are based on an N of 79.

Most French immersion students reported that they watch French television programs at least once or twice a week, and that they have good comprehension of French television and radio. Most of these students reported that they read French material outside of school at least once or twice a week and that they have good comprehension of what they read.

Table 29

Responses to the 1983 Subject Questionnaire for
French Immersion Subjects and Drop-Outs

	French Immersion		Drop-Outs	
	#	%	#	%
1. How often do you watch French T.V. programs?				
- Not at all or very rarely	34	43%	8	44%
- Once or twice a week	38	48%	8	44%
- More than twice a week	6	8%	2	12%
2. How often do you read French outside of school?				
- Not at all or very rarely	36	46%	13	76%
- Once or twice a week	29	37%	4	22%
- More than twice a week	11	14%	1	6%
3. How well do you understand radio and T.V. programs in French?				
- Not at all or only a few words	1	1%	8	44%
- Can follow with some difficulty	34	43%	7	39%
- Good Comprehension	40	51%	3	17%
4. How well do you understand the French material that you read outside school?				
- Not at all or only a few words	0	0%	4	22%
- Can follow with some difficulty	16	20%	7	39%
- Good comprehension	57	72%	7	39%
5. When you talk(ed) with your classmates, which language do/did you use after school or when the teacher can't (couldn't) hear?				
- English	60	76%	13	72%
- French	0	0%	2	12%
- Both	16	20%	3	16%
6. Do you think your family members would make fun of you if they heard you speaking French?				
- Yes	6	8%	2	12%
No	72	91%	16	88%

(Continued)

Table 29 (cont)

	French Immersion		Drop-Outs	
	#	%	#	%
7. Do you think any of your friends would make fun of you if they heard you speak French?				
- Yes	5	6%	5	28%
- No	73	92%	13	72%
8. a) How do you feel about speaking French in class?				
- Negative	7	9%	8	45%
- Positive	36	46%	7	39%
- Indifferent	34	43%	3	16%
b) How do you feel about speaking French outside of school?				
- Negative	16	20%	10	56%
- Positve	26	33%	3	16%
- Indifferent	35	44%	5	28%
9. a) Have you met any French speaking children in your neighbourhood?				
- Yes	49	62%	12	67%
- No	29	37%	6	33%
b) What language do you speak together?				
- English	8	16%	5	42%
- French	15	31%	2	16%
- Both	26	53%	5	42%
10. a) Have you any very good friends who are French-speaking?				
- Yes	50	63%	13	72%
- No	28	35%	5	28%
b) What language do you speak together?				
- English	12	24%	3	23%
- French	15	30%	2	15%
- Both	23	46%	8	62%

(Continued)

Table 29 (cont)

	French Immersion		Drop-Outs	
	#	%	#	%
11. Would you rather have English-speaking or French-speaking friends?				
- English	24	30%	11	61%
- French	2	3%	1	6%
- No preference	52	66%	6	33%
12. Would you like to play with more French-speaking children if you had the chance?				
- Yes	54	68%	6	33%
- No	24	30%	12	67%
13. a) Do you want to learn to speak French?				
- Yes	70	88%	12	66%
- No	2	3%	3	17%
- Indifferent	6	8%	3	17%
b) For what reasons?				
- Instrumental	18	23%	5	28%
- Integrative	21	27%	2	11%
- Both	17	22%	4	22%
- Like French	15	19%	1	6%
14. Would you rather be in a class where the teacher speaks English?				
- Yes	14	18%	N/A	
- No	61	77%	N/A	
Do you wish you were still in French immersion?				
- Yes	N/A		6	33%
- No	N/A		12	67%
15. Do you think the French immersion program as you know/knew it could be improved?				
- Yes	26	33%	9	50%
- No	52	66%	9	50%

Surprisingly, 56% of drop-outs reported that they watch French television programs at least once or twice a week. However, only 17% said that they have good comprehension of what they hear on television and radio. Only 28% of drop-outs said that they read French material outside of school at least once or twice a week, and 39% said they have good comprehension of what they read.

Approximately the same percentage of French immersion students (76%) compared to drop-outs (72%) said they speak (spoke) English to their French immersion classmates outside of school or whenever the teacher cannot (could not) hear them. Most French immersion subjects and drop-outs felt that neither their family members nor their friends would make fun of them if they heard them speaking French. Among the French immersion subjects, 46% felt positively about speaking French in school and 9% felt negatively about it, compared to 39% of drop-outs who felt positively and 44% who felt negatively. Thirty-three percent of French immersion subjects felt positively about speaking French outside of school and 20% felt negatively about it, compared to 17% of drop-outs who felt positively and 56% who felt negatively.

Most French immersion subjects and drop-outs said they knew French-speaking children in their neighbourhood. Eighty-four percent of French immersion subjects said they spoke French or both French and English to these French-speaking neighbours compared to 62% of drop-outs. Also, most French immersion subjects and drop-outs said they had good friends who are French-speaking. Seventy-six percent of French immersion subjects and 77% of drop-outs said they spoke French or both French and English to these friends. Thirty-one percent of French immersion subjects said they would rather have English-speaking friends compared to 61% of drop-outs. Sixty-nine percent of French immersion subjects said they would like to play with more French-speaking children compared to 33% of drop-outs.

When asked if they wanted to learn to speak French, 90% of French immersion subjects said yes, 3% said no, and 7% were indifferent compared to 66% of drop-outs who said yes, 17% who said no, and 17% who were indifferent. French immersion subjects cited integrative reasons (e.g., to communicate with people) more frequently than any other reasons, and drop-outs cited instrumental reasons (e.g., to get a better job) more often than any other reasons.

When asked if they would rather be in a class where the teacher speaks English, 18% of French immersion subjects said yes, and 77% said no. When asked if they wished they were still in French immersion, 33% of drop-outs said yes and 67% said no.

Subjects' Suggestions For Improving the French Immersion Program. Subjects were asked "Do you think that the French immersion program as you know (knew) it could be improved?". Of the French immersion subjects, 25 of the 78 made suggestions (1 did not answer), as did 9 of the 18 academic drop-outs tested in 1983 and 1 of the 8 of the non-academic drop-outs. Both Grade four French immersion students felt the program was fine as is.

The 38 suggestions are categorized and are shown in table 30. Overall, the most frequent suggestions were to make the program easier (17%), improve math teaching (14%), do more teaching of English (9%), have more materials to work with (9%), have more explanations in English (9%), and have more chances to interact with French people (9%).

Table 30

Suggestions for Improving the French Immersion Program
Given by French Immersion Subjects and Drop-Outs

	(n=25) French Immersion Success	(n=10) Drop-outs	Total
1. Make the program easier- there's too much work	4 (16%)	2 (20%)	6 (17%)
2. Improve math teaching:			
- teach math in English	3		
- teach more math	2 (20%)	0 (0%)	5 (14%)
3. Do more teaching of English	1 (4%)	2 (20%)	3 (9%)
4. Have more and better materials to work with (e.g. French readers)	3 (12%)	0 (0%)	3 (9%)
5. Give more explanations in English	1 (4%)	2 (20%)	3 (9%)
6. Have more chances to interact with French people	3 (12%)	0 (0%)	3 (9%)
7. Improve teaching methods in general	2 (8%)	0 (0%)	2 (6%)
8. Have more French immersion schools, so bussing wouldn't be necessary	1 (4%)	1 (10%)	2 (6%)
9. Have enrichment program in French immersion	1 (4%)	1 (10%)	2 (6%)
10. Do not have divided classes (e.g. grades 4 & 5 together)	1 (4%)	0 (0%)	1 (3%)

(Continued)

Table 30 (cont)

	(n=25) French Immersion Success	(n=10) Drop-outs	Total
11. Offer more challenging work	1 (4%)	0 (0%)	1 (3%)
12. Have more gym	1 (4%)	0 (0%)	1 (3%)
13. Make the program more "fun"	1 (4%)	0 (0%)	1 (3%)
14. Have French clubs available	1 (4%)	0 (0%)	1 (3%)
15. Have bilingual teachers	0 (0%)	1 (10%)	1 (3%)
16. Don't keep students in during recess	0 (0%)	1 (10%)	1 (3%)
17. Remove the subject science	1 (4%)	0 (0%)	1 (3%)
18. Don't like the present program but not sure how to improve it	1 (4%)	0 (0%)	1 (3%)
	28	10	38

Among French immersion students, the area most frequently mentioned as requiring improvement was math (20%) followed by the suggestions to make the program easier (16%), to have more and better materials (12%), and to have more opportunities to interact with French people (12%). Among drop-outs, the most frequent suggestions were to make the program easier (22%), to have more English (22%), and to have more explanations in English (22%).

Children's Personality Questionnaire. T-tests were performed between the French immersion and drop-out groups on the Children's Personality Questionnaire (CPQ) scores. Significant differences were found between the groups on three factors. However, on all of the factors including the three on which significant differences were found, no score for either group went outside the average range. Therefore, the descriptions for "high" and "low" scorers (those who score above one standard deviation above the mean or below one standard deviation below the mean) cannot be applied as absolute descriptions, but must be looked at as relative descriptions. The sten scores for the French immersion subjects and drop-outs on the CPQ may be found in Appendix VIII. The significant t-test comparisons are found in table 35.

French immersion students scored higher than drop-outs on factor B, which is described in the CPQ manual (Porter & Cattel, 1968) as "a brief estimate of general ability". It reflects the similar differences in IQ scores between the groups. French immersion students also scored higher than drop-outs on factor E. High scorers are described as more active, assertive, and aggressive while low scorers are described as more docile and submissive. Since both groups scored within the average range, these descriptions must be looked at as relative to one another only. Drop-outs scored higher than French immersion students on factor O. High scorers are described as having a sense of inferiority and inadequacy, often feeling guilty, whereas low scorers tend to feel adequate and self-assured. Again, since both groups scored within the average range, these descriptions are to be seen as relative to one another only.

Observer Checklist

Examiners rated the children using the Observer Checklist (Atwell, Orpet & Meyers, 1967) at all the grade levels. The only dimension on which French immersion subjects consistently differed from drop-outs was H (effort displayed), with French immersion subjects rated as showing greater effort than drop-outs during the test sessions. French immersion subjects also scored significantly higher on performance rate at all grade levels except the four-year-old Kindergarten level. The mean scores at each grade level for the French immersion subjects and drop-outs on each dimension of the Observer Checklist are given in Appendix VIII.

T-test Comparisons of French Immersion Subjects and Drop-Outs on the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, Grade One, Grade Four, and Grade Five Variables

T-tests were computed between the French immersion and drop-out groups on all the variables in the four-year-old Kindergarten, five-year-old Kindergarten, Grade one, Grade four, and Grade five test batteries. The results of these tests are shown in tables 31 to 35. French immersion subjects performed significantly better than drop-outs on most of the tests. In no instance did the drop-out group perform significantly better on any test. Drop-outs did score higher on the inattentive/passive scale and total score of the Connors Teacher Rating Scale at all the grade levels, and on several of the other scales (conduct problem, hyperactivity, tension/anxiety) at various grade levels.

Table 31

Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Four-Year-Old Kindergarten Variables

Variable	(n=79) French Immersion Mean	SD	(n=34) Drop-Outs Mean	SD	t	p
WPPSI:						
Verbal IQ	124.0	10.7	111.7	11.5	5.5	.000
Performance IQ	119.8	10.5	108.4	9.5	5.5	.000
Full scale IQ	124.3	10.0	110.9	9.3	6.7	.000
Information	14.3	2.8	12.3	2.6	3.1	.003
Vocabulary	14.1	2.4	11.5	2.2	5.4	.000
Arithmetic	13.8	2.3	11.8	2.2	4.5	.000
Similarites	14.0	2.3	12.0	2.5	4.0	.000
Comprehension	13.2	2.5	11.4	2.9	3.2	.002
Sentences	11.2	2.6	8.6	2.8	4.7	.000
Animal House	12.6	2.2	10.8	1.7	4.2	.000
Picture Completion	13.6	2.2	11.8	2.8	3.6	.000
Mazes	12.3	2.6	11.2	2.6	2.1	.042
Geometric Design	12.5	2.5	10.2	1.9	4.7	.000
Block Design	13.4	2.5	12.1	2.2	2.7	.009
Family Socioeconomic Status:	64.2	10.4	56.4	13.8	2.9	.006
PEABODY: IQ	117.2	13.5	111.6	12.0	2.1	.037
MATRICES: Raw score	18.2	4.7	15.4	4.1	3.0	.003
WIDE RANGE ACHIEVEMENT TEST:						
Reading grade score	1.2	.4	.9	.3	4.0	.000
Spelling grade score	.6	.4	.3	.3	4.3	.000
Arithmetic grade score	1.0	.4	.6	.3	5.5	.000
WORD SEGMENTING						
Total Number Words segmented in any way	14.5	3.0	11.9	5.9	2.4	.019
Partial Number Words segmented in any way	7.2	1.6	6.0	2.9	2.3	.028

(Continued)

Table 31 (cont)

Variable	(n=79) French Immersion Mean	SD	(n=34) Drop-Outs Mean	SD	t	p
PICTURE NAMING:						
Pictures/Sec.	.5	.1	.4	.1	3.2	.002
OBSERVER CHECKLIST:						
D - Amount of speech	5.7	1.5	5.1	1.8	2.0	.045
E - Attention	5.2	1.4	4.6	1.6	2.0	.044
G - Self-Confidence	5.5	1.6	4.6	1.5	2.7	.008
H - Effort displayed	5.2	1.4	4.5	1.5	2.4	.019
I - Cooperation	5.7	1.4	5.0	1.6	2.5	.013
RENFREW:						
Information	26.1	3.1	24.3	3.6	2.7	.007
Grammar	28.1	3.6	26.5	4.4	2.1	.041
CONNORS TEACHER:						
Conduct Problem	7.0	10.6	14.8	19.1	-2.2	.030
Inattentive-Passive	14.3	15.5	25.8	20.4	-3.3	.001
Hyperactivity	15.1	19.2	29.3	30.8	-2.5	.017
Total	12.5	11.3	19.2	15.6	-2.3	.028
MYKLEBUST:						
Aud. Comp.	14.3	2.6	11.6	2.4	5.2	.000
Spoken Language	17.0	2.7	14.5	2.6	4.5	.000
Motor Coord.	10.1	1.8	8.9	2.1	3.2	.002
Personal/Social	26.5	4.2	22.6	4.3	4.4	.000
Verbal	31.4	5.1	26.1	4.6	5.2	.000
Nonverbal	49.5	7.0	43.5	4.9	5.1	.000
Total	80.5	12.2	69.6	8.2	5.4	.000
CIRCUS:						
#2: How much and how many	33.4	3.3	28.3	4.9	5.6	.000
#5: Finding letters and numbers	18.1	1.9	15.8	3.6	3.5	.001
#7: How words sound	41.2	2.2	37.7	3.2	5.8	.000
#9: Listen to the story	18.5	2.7	15.6	3.1	5.0	.000
#13: Think it through	22.3	3.8	18.0	3.6	5.6	.000

Table 32

Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Five-Year-Old Kindergarten Variables

Variable		(n=79) French Immersion Mean	SD	(n=34) Drop-Outs Mean	SD	t	p
FRENCH COMPREHENSION TEST		27.1	6.7	23.6	6.2	2.5	.013
PEABODY:	IQ	119.4	13.9	112.0	12.2	2.7	.008
RENFREW:	Information	35.2	3.4	23.8	3.4	2.1	.041
WORD SEGMENTING:	Total number words segmented at syllable boundaries	11.5	2.6	10.1	2.9	2.7	.009
WRAT:	Reading grade score	1.6	1.0	1.1	.3	3.7	.000
	Spelling grade score	1.2	.3	1.0	.3	3.2	.002
	Arithmetic grade score	1.7	.5	1.1	.4	6.6	.000
LETTER NAMING (French):		8.5	4.4	5.8	4.3	3.1	.003
CIRCUS:	#9 Listen to the story	21.4	2.6	19.7	2.4	3.2	.002
	#13 Think it Through	25.7	2.5	23.8	2.9	3.4	.001
OBSERVER CHECKLIST:							
	B - Performance rate	5.6	1.7	4.1	1.4	4.7	.000
	C - Manual dexterity	5.7	1.6	5.0	1.1	2.5	.013
	E - Attention	5.6	1.5	4.3	1.5	4.1	.000
	F - Anxiety	5.7	2.3	4.8	2.0	2.0	.048
	G - Self-confidence	5.2	2.0	4.5	1.1	2.4	.018
	H - Effort displayed	6.3	2.7	4.8	2.6	2.7	.008
	J - Interest	5.5	1.6	4.8	1.5	2.1	.042
CONNORS TEACHER:							
	Inattentive/Passive	14.6	18.2	40.0	25.1	-5.1	.000
	Hyperactivity	15.4	21.6	30.0	27.0	-2.9	.004
	Total	12.9	10.7	21.8	16.3	-2.8	.006
PICTURE NAMING:							
	Picutres/Sec.	.2	.2	.1	.1	3.4	.001

Table 33

Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Grade One Variables

Variable		(n=79) French Immersion Mean	SD	(n=34) Drop-Outs Mean	SD	t	p
WRAT:	Reading grade score	2.5	1.3	1.7	.7	3.8	.000
	Spelling grade score	2.0	.8	1.6	.5	2.8	.007
	Arithmetic grade score	2.3	.4	2.0	.4	4.1	.000
RENFREW:	Information	28.1	2.7	26.9	3.1	2.2	.034
	Grammar	33.0	2.8	30.1	5.8	2.7	.009
PEABODY:	IQ (A)	84.0	25.7	64.0	15.1	5.1	.000
FRENCH PEABODY:	IQ	80.6	20.1	65.4	17.4	3.8	.000
FRENCH COMPREHENSION TEST:		32.4	5.3	20.5	10.2	6.4	.000
KNOWLEDGE OF LETTERS (FRENCH):		12.7	.5	11.4	1.6	4.6	.000
KNOWLEDGE OF NUMBERS (FRENCH):		12.2	1.6	6.9	5.3	5.8	.000
RENDEMENT:	RAW SCORE	14.1	3.5	8.6	3.9	7.3	.000
OBSERVER CHECKLIST:							
	B - Performance rate	5.2	1.5	4.6	1.2	2.0	.049
	H - Effort displayed	5.3	1.2	4.7	1.0	2.7	.008
	I - Cooperation given	6.4	1.1	5.8	1.1	2.7	.007
	J - Interest	6.3	1.2	5.5	1.1	3.1	.003
CONNORS TEACHER:							
	Inattentive/Passive	20.0	19.5	35.0	22.8	-3.6	.001
	Total	14.6	12.2	20.9	11.7	-2.6	.012
PICTURE NAMING:							
	Pictures/Sec.	.4	.1	.2	.1	7.4	.000

Table 34

Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Grade Four Variables

Variable		(n=79) French Immersion Mean	SD	(n=18) Drop-Outs Mean	SD	t	p
WRAT:	Reading grade score	7.5	.7	6.4	1.5	3.1	.006
	Spelling grade score	6.2	1.1	5.5	1.1	2.8	.006
PEABODY:	IQ (A)	119.9	15.0	103.3	16.5	4.2	.000
	IQ (B)	121.3	17.7	106.4	12.6	3.4	.001
OBSERVER CHECKLIST:							
	B - Performance rate	6.2	1.5	5.3	1.2	2.3	.023
	H - Effort displayed	6.7	1.2	6.0	1.1	2.3	.022
*CONNORS TEACHER (ENGLISH) (% SCORES):							
	Conduct problem	3.2	6.5	15.6	20.7	-2.3	.037
	Inattentive/Passive	11.4	14.0	27.4	20.5	-2.9	.010
	Tension/anxiety	7.8	11.6	19.9	14.2	-3.5	.001
	Hyperactivity	12.1	18.0	30.5	27.8	-2.5	.025
	Total	7.5	8.5	22.2	18.6	-3.0	.009
**CONNORS TEACHER (HOMEROOM) (% SCORES)							
	Conduct Problem	3.1	7.3	15.6	20.7	-2.3	.036
	Hyperactivity	14.1	21.2	30.5	27.8	-2.5	.014

* Children in French immersion rated by their English teacher

** Children in French immersion rated by French teacher and children in English (drop-outs) rated by English teacher

Table 35

Means, Standard Deviations, and Significant T-Test Comparisons of French Immersion Subjects and Drop-Outs on the Grade Five Variables

Variable		(n=79) French Immersion Mean	SD	(n=18) Drop-Outs Mean	SD	t	p
WRAT:	Reading grade score	7.9	.8	6.5	1.5	3.8	.001
	Spelling grade score	6.8	.8	6.0	1.0	3.6	.001
	Arithmetic grade score	5.2	.9	4.7	.6	3.2	.003
PEABODY:	IQ (A)	121.7	15.7	100.2	15.6	5.2	.000
	IQ (B)	118.3	18.7	106.7	15.8	2.4	.016
DURRELL:							
	Oral Reading Grade	5.3	.8	4.5	1.1	3.1	.003
	Silent Reading Grade	4.9	.7	4.2	.9	3.0	.003
	Listening Comprehension	4.6	1.0	3.7	1.0	3.2	.002
CHILDREN'S PERSONALITY QUESTIONNAIRE:							
	E - Obedient/Assertive	6.1	2.0	4.9	2.4	2.1	.035
	B - Less intelligent/ more intelligent	6.5	1.8	5.5	1.6	2.1	.040
	O - Self-assured/ apprehensive	5.0	1.6	5.9	1.8	-2.2	.034
TACTUAL PERFORMANCE TEST:							
	Memory	6.4	1.1	5.6	1.3	2.6	.010
OBSERVER CHECKLIST:							
	B - Performance rate	5.6	1.5	4.2	1.0	4.7	.000
	G - Self-confidence	5.7	1.3	4.8	.9	2.7	.008
	H - Effort displayed	5.9	1.7	5.0	1.7	2.1	.041
CONNORS TEACHER (ENGLISH)(% SCORE):							
	Inattentive/Passive	13.3	16.4	31.9	18.5	-4.0	.000
	Tension/anxiety	11.2	11.1	22.1	13.2	-3.5	.001
	Hyperactivity	11.7	19.2	26.2	22.4	-2.7	.009
	Total	8.9	8.7	20.3	12.0	-4.4	.000
CONNORS TEACHER (HOMEROOM)(%SCORE):							
	Inattentive/Passive	18.0	18.3	31.9	18.5	-2.8	.007

EARLY DROP-OUTS VERSUS LATE DROP-OUTS

T-tests Comparisons of Early and Late Drop-Outs on the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, Grade One, Grade Four, and Grade Five Variables.

T-tests were performed between the early and late drop-out groups on all the variables from four-year-old Kindergarten through Grade five. The results of the significant t-test comparisons are shown in table 36. Significant differences were found in terms of socioeconomic status. Early drop-outs were found to come from families of higher socioeconomic status than late drop-outs.

At the end of four-year-old Kindergarten, before any child had entered the French immersion program, those who were to drop out by the end of Grade one (early drop-outs) scored significantly lower on reading and arithmetic (as measured by the Wide Range Achievement Test) than those who were to drop out between Grades two and five (late drop-outs). A marginally significant difference was found on one observer rating, with early drop-outs being rated lower than late drop-outs on manual dexterity.

At the end of five-year-old Kindergarten, one of the early drop-outs had already left the program (after six months), and 14 others would begin Grade one in the English program. A marginally significant difference was found between the two groups in terms of observer ratings of manual dexterity, with early drop-outs scoring lower than late drop-outs. A significant difference was found in the number of errors in picture naming in French, with early drop-outs scoring significantly lower than late drop-outs.

All 17 early drop-outs had left the program by March of the Grade one year. Many significant differences were found at the Grade one level on both French and English measures. As would be expected, late drop-outs scored significantly higher than early drop-outs on all measures of French achievement, including the French Comprehension Test, French Peabody Picture Vocabulary Test, knowledge of letters and numbers in French, the Test de Rendement, and picture naming in French. Late drop-outs would have been in the French immersion program on average a full school year longer than the early drop-outs, and thus would have learned more French during this time.

Table 36

Means, Standard Deviations, and Significant T-Test Comparisons of Early and Late-Drop Outs on the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, Grade One, Grade Four, and Grade Five Variables

	Early Drop-Outs		Late Drop-Outs		t	p
K4 Variables	Mean	SD	Mean	SD		
Family Socioeconomic Status:	61.3	12.2	48.7	13.1	11.5	.000
WRAT: Reading grade score	.8	.3	1.0	.3	2.1	.042
Arithmetic grade score	.4	.3	.7	.3	2.9	.007
Observer Checklist:						
C - Manual dexterity	4.6	1.1	5.4	1.5	1.9	.069
K5 Variables						
Observer Checklist:						
C - Manual dexterity	4.6	.8	5.4	1.3	2.0	.060
Picture Naming: # Correct	8.3	2.8	11.0	3.2	2.6	.015
Gr 1 Variables:						
French Comprehension Test:	12.4	3.8	28.6	7.8	7.7	.000
WRAT: Reading grade score	2.0	.9	1.4	.4	-2.4	.023
Spelling grade score	1.9	.6	1.4	.1	-3.6	.002
PEABODY: French Form IQ score	57.9	4.4	72.8	22.0	2.7	.014
Knowledge of Letters in French:	10.6	2.0	12.1	.7	2.8	.012
Knowledge of Numbers in French:	3.1	3.7	10.8	3.5	6.3	.000
Test de Rendement (Raw Score):	5.5	1.9	11.9	2.4	8.4	.000
Observer Checklist:						
I - Cooperation	5.5	1.1	6.2	1.0	1.9	.064
Picture Naming: # Correct	6.4	2.3	13.3	3.3	7.2	.000
# Correct/Unit Time (sec)	.1	.1	.2	.1	4.7	.000
Gr 4 Variables						
Observer Checklist:						
F - Anxiety	6.6	1.2	5.3	1.1	2.38	.029
I - Cooperation	6.2	.8	7.2	.6	2.90	.010
Gr 5 Variables						
Children's Personality Questionnaire (Sten Scores):						
C - Affected by feeling/ Emotionally stable	6.7	1.8	5.1	1.2	2.2	.040
H - Shy/Venturesome	6.7	.8	4.8	1.9	2.4	.030
O - Self-Assured/ Insecure	4.5	1.0	6.6	1.8	2.6	.019

It is important that the early drop-outs were doing significantly better than the late drop-outs on two measures of English achievement: WRAT reading and spelling. This may reflect the fact that the French language is used exclusively in five-year-old Kindergarten and Grade one, and most of the early drop-outs would have received by the end of Grade one a year of English schooling whereas the late drop-outs would have received none. A marginally significant difference was found for observer ratings of cooperativeness, with late drop-outs rated as more cooperative than early drop-outs by the examiners.

The scores of those early and late drop-outs who were tested in Grade four and Grade five were compared using t-tests in order to determine whether late drop-outs suffered any greater academic setbacks than those who dropped out of French immersion at an earlier grade.

There were 19 academic drop-outs tested at the end of Grade four, 9 of whom had dropped out of French immersion before the end of Grade one. There were 18 academic drop-outs tested at the end of Grade five, 6 of whom had dropped out of French immersion before the end of Grade one.

There were no significant differences between the two groups on any of the measures of academic achievement at either the Grade four or Grade five level. At the Grade four level, early drop-outs were rated on the Observer Checklist as being more anxious than late drop-outs and as being less cooperative with the examiner than late drop-outs. At the Grade five level, significant differences were found on three subscales of the Children's Questionnaire. The sten scores on the CPQ scores for the early and late drop-outs may be found in Appendix VIII.

The descriptions set out in the manual for the CPQ (Porter and Cattell, 1975) can be used to describe how the early drop-out group differs from the late drop-out group on this personality test.

Factor C. Early drop-outs scored high on this factor. High scorers are described as "relatively calm, stable, and socially mature for their age". Late drop-outs score within the average range on this factor, and therefore the description of the low scorer does not apply.

Factor H. Early drop-outs scored high on this factor. High scorers are described as "sociable in the sense that they interact freely and boldly with people". Late drop-outs score within the average range on this factor.

Factor O. Late drop-outs scored high on this factor. High scorers are described as having "a sense of inferiority and inadequacy". Early drop-outs score on the border of the low/average range. Low scorers are described as tending to feel "entirely adequate and self-confident".

It appears that these personality differences may be partially the result of the different school situations of early and late drop-outs. It is quite likely that feelings of inferiority, inadequacy, and unacceptance could be instilled in a child who has done poorly in school for an extended period of time, as is the case for the late drop-outs. Early

drop-outs, having left a school situation in which they were not performing as well as most of their peers an average of two years before the late drop outs, appear to be better adjusted personally and socially.

It is of considerable interest to note that differences between the groups on English academic measures had disappeared by Grades four and five. It seems that those children who spent longer in the program caught up in English skills once they transferred to the English program.

Parents' Reasons for Withdrawing Their Child from French Immersion

At each year's testing, parents of children who had dropped out of French immersion that year were asked to express their reasons for withdrawing their child from the program. Seventeen categories of reasons were found, and the frequencies of their occurrence are given in table 37, broken down for early, late and non-academic drop-outs. All the reasons given by each parent were recorded, and the table does not indicate the order in which the reasons were given.

The most frequently cited reason among academic drop-outs was that the child was frustrated or unhappy in French immersion (19%). The next most prevalent reason was general difficulties in the French language (16%) followed by social/emotional adjustment problems (13%). Among non-academic drop-outs the most frequently given reason was enrichment opportunity in an English class (27%). There appears to be little difference in the types of reasons given by parents of early and late drop-outs for withdrawing their children from French immersion. However, when the order in which the reasons were given by the parents was taken into account, it was found that 8 of the 17 parents of early drop-outs cited emotional reasons first, compared to 4 of the 16 parents of late drop-outs. When subjected to Chi-square analysis, this difference was not found to be significant.

Table 37

Parents' Reasons for Withdrawing their Children from the French Immersion Program

	EARLY			LATE			TOTAL
	Acad.	Non-Acad.	Total	Acad.	Non-Acad.	Total	
1. Child frustrated/unhappy in program	6	1	7	5	--	5	12
2. General difficulties in French language	5	--	5	5	--	5	10
3. Social/emotional adjustment problems	3	--	3	5	--	5	8
4. General academic difficulties	3	--	3	3	--	3	6
5. Lack of concentration/ motivation	3	--	3	3	--	3	6
6. Specific learning disability	4	--	4	1	--	1	5
7. Trouble acquiring English skills	2	--	2	3	--	3	5
8. Unacceptable treatment of child by teacher/school	--	--	--	4	--	4	4
9. Enrichment opportunity in English class	--	1	1	--	3	3	4
10. No remedial help available in French immersion	1	--	1	2	--	2	3
11. Parents moved/wanted child in neighbourhood school	--	2	2	--	--	--	2
12. Dissatisfaction with lack of Christian influence in curriculum	--	2	2	--	--	--	2
13. Auditory discrimination difficulties	2	--	2	--	--	--	2

(Continued)

Table 37 (cont)

	EARLY			LATE			TOTAL
	Acad.	Non-Acad.	Total	Acad.	Non-Acad.	Total	
14. Math skills needed improving	--	--	--	1	--	1	1
15. Hearing problem	--	1	1	--	--	--	1
16. Teachers felt child would have difficulty or not pass later on	--	--	--	1	--	1	1
17. Belief that mastery of English more important	--	1	1	--	--	--	1
			37			36	73

DROP-OUTS VERSUS LOW ACHIEVERS AND HIGH ACHIEVERS

The 34 children who had dropped out of French immersion for academic reasons were compared to those children in the French immersion program defined as low achievers and those defined as high achievers earlier in this report.

Descriptive Information

The three groups were compared on several descriptive variables including sex, handedness, age, IQ, and family socioeconomic status. The results of the Chi-square analyses for sex and handedness are shown in table 38. Significant differences among the groups were found for sex but not for handedness. There was a higher proportion of males in the drop-out and low-achiever groups than in the high-achiever group and a higher proportion of females in the high-achiever group than in the drop-out group.

The results of one-way analyses of variance performed on the variables age, WPPSI Verbal, Performance, and Full Scale IQ, and family socioeconomic status are shown in table 39. The groups did not differ in terms of age, but differed on every other variable. Scheffes multiple comparisons were performed to determine where the differences were to be found. Although no two groups were found to differ significantly on family socioeconomic status, examination of the means indicates that drop-outs were from lower socioeconomic status families than either low or high achievers. Low and high achievers did not differ from one another on socioeconomic status.

Drop-outs scored significantly lower on Verbal and Full Scale IQ than did low or high achievers. Low and high achievers did not differ on these variables. Performance IQ differentiated among all three groups. Drop-outs scored lower on Performance IQ than low achievers who in turn scored lower than high achievers.

Table 38

Sex and Handedness Comparisons of Drop-Outs,
Low Achievers, and High Achievers

	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
SEX							
Male	21	61.8	5	50.0	2	15.4	4.0*
Female	13	38.2	5	50.0	11	84.6	4.1*
$Chi^2 = 8.1$ $p < .05$							
HANDEDNESS							
Left	6	17.6	1	10.0	1	7.7	--
Right	28	82.4	9	90.0	12	92.3	--
$Chi^2 = .9$ (NS)							

* = $p < .05$
NS = Not statistically significant

Table 39

Age, Verbal IQ, Performance IQ, Full Scale IQ, and Socioeconomic
Status Comparisons of Drop-Outs, Low Achievers, and High Achievers

Variable	Drop-Outs		Low Achievers		High Achievers I		F	df	p
	Mean	SD	Mean	SD	Mean	SD			
AGE	10.8	.3	10.8	.3	10.9	.2	.1	(2,54)	.900
SESFAM	55.2	14.0	66.5	8.9	65.4	7.6	4.4	(2,52)	.020
VIQ	111.7a	11.5	116.5a	7.0	133.9b	8.3	22.5	(2,54)	.000
PIQ	108.4a	9.5	116.8b	5.9	129.7c	8.9	27.4	(2,54)	.000
FSIQ	110.9a	9.3	118.3a	4.1	135.0b	7.2	40.7	(2,54)	.000

Note: Means bearing the same subscript do not differ significantly

Biographical and Background Information Questionnaire

Chi-square analyses of the parents' responses to this questionnaire indicated significant differences among the drop-outs, low achievers, and high achievers on only one variable: whether or not their mothers had taken a postsecondary course in French. The results of this analysis are shown in table 40. One sample Chi-square tests indicated that a greater proportion of mothers of high achievers compared to drop-outs and low achievers had taken a postsecondary course in French.

No significant differences were found in terms of nursery school attendance, parental attitudes towards the French language, parents' desire to learn to speak French, whether or not the fathers had taken a postsecondary French course, exposure to French in the home and neighbourhood, the number of siblings enrolled in French immersion, and advantaged home backgrounds as indicated by the number of books in the home and the parents' efforts to read to the child.

Parents' Original Reasons for Enrolling Their Child in French Immersion

Parents' original reasons for enrolling their child in French immersion are shown in table 41 for drop-outs, low achievers, and high achievers. Parents of children in all three groups gave reason number 1 most frequently (that French immersion is an opportunity to learn to speak French and become proficient in Canada's two official languages). Parents of high achievers gave reason number 2 almost as frequently (that French immersion is an efficient way to teach the language and that the younger a child is, the better). Parents of drop-outs gave reason number 2 as their second most frequent choice. Parents of low achievers gave reason number 11 (general betterment of education) as their second most frequent reason.

Table 40

Chi-Square Comparisons of Drop-Outs, Low Achievers, and High Achievers in Terms of Whether or Not Mother Had Taken a Post-secondary Course in French

Has mother taken a post-secondary course in French?

	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
Yes	9	26.5	2	20.0	10	76.9	7.5**
No	25	73.5	8	80.0	3	23.1	4.4*

$Chi^2 = 11.9$ (df = 2) $p < .01$

* = $p < .05$

** = $p < .01$

Table 41

Frequency of Occurrence of 11 Categories of Reasons Given by Parents of Drop-Outs, Low and High Achievers for Enrolling Their Child in French Immersion

Reasons	Drop-Outs		Low Achievers		High Achievers	
	#	%	#	%	#	%
1. Opportunity to learn to speak French; to have proficiency in Canada's two offical languages	21	64%	6	75%	5	38%
2. Most painless and efficient way to teach a child a language; the younger the better for teaching a child to speak a new language comfortably and well	5	15%	0		4	30%
3. Very positive attitude of child: (interested, eager, enthusiastic)	1	3%	0		0	
4. Availability of program in local school (no English Kindergarten)	0		0		1	8%
5. Increase future employment opportunities	2	6%	0		1	8%
6. Increase understanding of other cultural groups	2	6%	0		1	8%
7. Child enjoys school and is having no problems	0		0		0	
8. Program is a challenge and should help prevent boredom in the second Kindergarten year	0		0		0	

(Continued)

Table 41 (cont)

Reasons	Drop-Outs		Low Achievers		High Achievers	
	#	%	#	%	#	%
9. Communication enrichment (All language skills will be improved)	0		0		0	
10. Good experience with French immersion of siblings or friends	1	3%	0		0	
11. General betterment of education (any second language is of value)	1	3%	2	25%	1	8%
	33		8		13	

Parents of all three groups tended to have quite similar reasons for enrolling their children in French immersion. The reasons they gave were predominantly integrative as opposed to instrumental in nature, as these dimensions are described by Gardner and Lambert (1959).

Teachers' Advice Regarding French Immersion Enrolment

The results of Chi-square analyses of the four-year-old Kindergarten, five-year-old Kindergarten, and Grade one teachers' advice regarding French immersion enrolment are presented in table 42. Significant differences were found at all three grade levels. One-sample Chi-square tests were computed to determine group differences.

At all three grade levels, French immersion was not advised for a significantly greater proportion of drop-outs than high achievers. All the teachers predicted quite accurately the success of high achievers. A slightly larger proportion of low achievers than high achievers were not advised to enter French immersion, although most low achievers were advised to enrol in French immersion. Teachers advised French immersion for over 40% of drop-outs at the four-year-old Kindergarten level. As was found when comparing drop-outs and the French immersion success group, teachers at all three grade levels tended to advise French immersion more often than not advising it.

Teacher Ratings

Chi-square analyses of four-year-old Kindergarten, five-year-old Kindergarten and Grade one teacher ratings for the drop-outs, low achievers, and high achievers are presented in tables 43, 44, and 45. At the four-year-old and five-year-old Kindergarten levels, all 34 academic drop-outs were included. At the Grade one level, only the 17 late drop-outs were included since the 17 early drop-outs had already left the French immersion program by the time of that assessment.

Table 42

Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade One Teachers' Advice Regarding French Immersion Enrolment

	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
K4 teachers' advice							
Advised	11	44.0	5	83.3	11	91.7	3.4
Not advised	14	56.0	1	16.7	1	8.3	5.8*
$Chi^2 = 9.2$ $p<.01$							
K5 teachers' advice							
Advised	19	61.3	8	88.9	13	100.1	2.3
Not Advised	12	38.7	1	11.1	0	0.0	6.4*
$Chi^2 = 8.7$ $p < .05$							
Gr 1 teachers' advice							
Advised	6	42.8	5	55.6	13	100.0	3.7
Not advised	8	57.2	4	44.4	0	0.0	7.1*
$Chi^2 = 10.8$ $p<.001$							

K4 drop-outs (n=34)
K5 drop-outs (n=33)
Gr 1 drop-outs (n=17)

* = $p < .05$

Four-Year-Old Kindergarten Teacher Ratings. The Chi-Square analyses of the four-year-old Kindergarten teacher ratings for the three groups on ability, social maturation, and motivation are shown in table 43. No significant differences were found among the groups with regard to ability or social maturation. A significant difference was found for motivation, with one-sample Chi-square tests indicating that high achievers received a greater proportion of above-average ratings than drop-outs. Among the high achievers, 46% were rated above average on motivation compared to 30% of low achievers and 12% of drop-outs.

Five-Year-Old Kindergarten Teacher Ratings. The Chi-square analyses of the five-year-old Kindergarten teacher ratings for the three groups on comprehension of French, French oral skills, and functioning level are given in table 44. Significant differences were found among the groups on comprehension of French and French oral skills, but not for functioning level.

One-sample Chi-square tests indicated that a greater proportion of drop-outs were given below-average ratings on both comprehension of French and French oral skills and that a greater proportion of high achievers received above-average ratings on these variables. Thirty-nine percent of drop-outs were rated below average on comprehension of French compared to 10% of low achievers and 0% of high achievers. Fifty-two percent of drop-outs were rated below average on French oral skills compared to 20% of low achievers and 8% of high achievers. Fifty-four percent of high achievers received above-average ratings on comprehension of French compared to 20% of low achievers and 13% of drop-outs. Forty-six percent of high achievers were rated above average on French oral skills compared to 30% of low achievers and 13% of drop-outs.

Table 43

Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Four-Year-Old Kindergarten Teacher Ratings of Ability, Social Maturation, and Motivation

	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
ABILITY							
Below average	2	5.9	0	0	0	0	--
Average	21	61.8	4	40.0	6	46.2	--
Above average	11	32.4	6	60.0	7	53.8	--
$Chi^2 = 4.2$ df = 4 (NS)							
SOCIAL MATURATION							
Below average	6	17.6	3	30.0	0	0.0	--
Average	26	76.5	5	50.0	9	69.2	--
Above average	2	5.9	2	20.0	4	30.8	--
$Chi^2 = 8.6$ df = 4 (NS)							
MOTIVATION							
Below average	2	5.9	2	20.0	0	0.0	3.4
Average	28	82.4	5	50.0	7	53.8	1.9
Above average	4	11.8	3	30.0	6	46.2	5.1*
$Chi^2 = 10.4$ df = 4 $p<.05$							

* = $p < .05$

NS = Not statistically significant ($p > .05$)

Table 44

Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Five-Year-Old Kindergarten Teacher Ratings of Comprehension of French, French Oral Skills, and Functioning Level

	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
COMPREHENSION OF FRENCH							
Below average	12	38.7	1	10.0	0	0.0	6.6*
Average	15	48.4	7	70.0	6	46.2	.8
Above average	4	12.9	2	20.0	7	53.8	6.6*
$Chi^2 = 14.0$ df = 4 $p<.01$							
FRENCH ORAL SKILLS							
Below average	16	51.6	2	20.0	1	7.7	5.8*
Average	11	35.5	5	50.0	6	46.2	.5
Above average	4	12.9	3	30.0	6	46.2	4.5*
$Chi^2 = 10.8$ df = 4 $p<.05$							
FUNCTIONING LEVEL							
Early K	4	12.5	0	0.0	0	0.0	--
Mid-K	12	37.5	4	40.0	6	46.2	--
Ready for Gr 1	16	50.0	6	60.0	7	53.8	--
$Chi^2 = 3.2$ df = 4 (NS)							

* = $p < .05$

NS = Not statistically significant ($p > .05$)

Although there was a tendency for more drop-outs to be rated as being at the early Kindergarten level (13% of drop-outs compared to 0% of low and high achievers), this was not found to be significant.

Grade One Teacher Ratings. The Chi-square analyses of the Grade one teacher ratings for the three groups on comprehension of French, French oral skills, reading in French, confidence and willingness in French, and functioning level are shown in table 45. Significant differences were found among the groups on all the above variables except functioning level. One-sample Chi-square tests were calculated to locate group differences.

A greater proportion of drop-outs (82%) and low achievers (100%) were rated average on comprehension of French than were high achievers (23%). A greater proportion of high achievers (77%) were rated above average on this dimension than were low achievers (0%) and drop-outs (6%).

A greater proportion of drop-outs (24%) were rated below average on French oral skills than were low achievers (0%) and high achievers (0%). A greater proportion of high achievers (54%) were rated above average on this dimension than were low achievers (10%) and drop-outs (6%).

A greater proportion of drop-outs (75%) and low achievers (80%) were rated below average on reading skills in French than were high achievers (23%). A greater proportion of high achievers (77%) received above-average ratings on this dimension compared to low achievers (10%) and drop-outs (13%).

A greater proportion of drop-outs (24%) were rated below average on confidence and willingness in French compared to low achievers (0%) and high achievers (0%). A greater proportion of high achievers (54%) received above average ratings on this dimension than did low achievers (0%) and drop-outs (18%).

Table 45

Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Grade One Teacher Ratings of Comprehension of French, French Oral Skills, Reading Skills in French, Confidence and Willingness in French, and Functioning Level

	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
COMPREHENSION OF FRENCH							
Below average	2	11.7	0	0.0	0	0.0	2.5
Average	14	82.3	10	100.0	3	23.1	5.8*
Above average	1	6.0	0	0.0	10	76.9	5.0*
$Chi^2 = 13.3$ df = 4 $p<.01$							
FRENCH ORAL SKILLS							
Below average	4	23.5	0	0.0	0	0.0	5.4*
Average	12	70.5	9	90.0	6	46.2	1.6
Above average	1	6.0	1	10.0	7	53.8	8.6**
$Chi^2 = 15.6$ df = 4 $p<.01$							
READING SKILLS IN FRENCH							
Below average	2	12.5	1	10.0	0	0.0	1.6
Average	12	75.0	8	80.0	3	23.1	4.3*
Above average	2	12.5	1	10.0	10	76.9	11.3***
$Chi^2 = 17.2$ df = 4 $p<.001$							
CONFIDENCE AND WILLINGNESS IN FRENCH							
Below average	4	23.5	0	0.0	0	0.0	5.4*
Average	10	58.8	10	100.0	6	46.2	3.7
Above average	3	17.7	0	0.0	7	53.8	7.4**
$Chi^2 = 16.5$ df = 4 $p<.01$							
PRESENT FUNCITONING LEVEL							
Early Gr 1	1	6.0	0	0.0	0	0.0	1.5
Mid-Gr 1	8	47.0	3	30.0	6	46.2	2.3
Ready for Gr 2	8	47.0	7	70.0	7	53.8	1.7
$Chi^2 = 5.5$ df = 4 (NS)							

* = $p<.05$

** = $p<.01$

*** = $p<.001$

NS = Not statistically significant ($p>.05$)

At the end of Grade one, approximately half the drop-outs and high achievers and two-thirds of the low achievers were rated as being ready for Grade two. It is interesting that although no high achievers received below-average ratings on any of the above dimensions, their teachers considered only one-half of them to be ready for Grade two. Teachers appeared to be placing a good deal of importance on French oral skills and willingness and confidence in French since the children who were rated average on these dimensions were considered to be only at the mid-grade-one level, despite the fact that one half of these children scored above average on comprehension of French and reading skills in French.

Difficulty and Special Help in School

The Chi-square analyses of four-year-old Kindergarten, five-year-old Kindergarten, and Grade one teachers' reports of difficulty and special help in school are presented in tables 46 and 47.

No significant differences were found for the four-year-old Kindergarten teacher reports of difficulty in school, but significant differences were found at both the five-year-old Kindergarten and Grade one levels. One-sample Chi-square tests indicated that at the five-year-old Kindergarten level, teachers reported difficulties for a greater proportion of drop-outs (69%) compared to low achievers (30%) and high achievers (23%). At the Grade one level, teachers reported difficulties for a greater proportion of both drop-outs (65%) and low achievers (50%) compared to high achievers (0%) (see table 46).

Chi-square analyses indicated significant differences among the groups in terms of special help received at the five-year-old Kindergarten and Grade one levels. One-sample Chi-square tests showed that a significantly greater proportion of drop-outs compared to low achievers and high achievers received special help at the five-year-old Kindergarten level. At the Grade one level, a significantly greater proportion of both drop-outs and low achievers compared to high achievers received special help (see table 47).

Table 46

Chi-Square Analyses Comparing Drop-Outs, Low Achievers, and High Achievers in Terms of Difficulty in School as Reported by Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade One Teachers

Difficulty in School	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
K4 TEACHER							
Yes	8	27.6	3	30.0	0	0	
No	21	72.4	7	70.0	12	100	
$Chi^2 = 4.3$ df = 2 (NS)							
K5 TEACHER							
Yes	22	68.8	3	30.0	3	23.1	4.9*
No	10	31.2	7	70.0	10	76.9	5.0*
$Chi^2 = 9.9$ df = 2 $p < .01$							
GR 1 TEACHER							
Yes	11	64.7	5	50.0	0	0.0	7.2**
No	6	35.3	5	50.0	13	100.0	6.6**
$Chi^2 = 13.8$ df = 2 $p < .001$							

* = $p < .05$

** = $p < .01$

NS = Not statistically significant ($p > .05$)

Table 47

Chi-Square Analyses Comparing Drop-Outs, Low Achievers and High Achievers in Terms of Special Help Received in School as Reported by Kindergarten, Five-Year-Old Kindergarten and Grade One Teachers

Special Help	Drop-Outs		Low Achievers		High Achievers		One Sample
	#	%	#	%	#	%	Chi^2
K5 TEACHER							
Yes	19	59.4	2	20.0	1	7.7	7.3**
No	13	40.6	8	80.0	12	92.3	5.0
$Chi^2 = 12.3$ df = 2 p <.01							
GR 1 TEACHER							
Yes	15	44.1	4	40.0	0	0.0	5.6*
No	19	55.9	6	60.0	13	100.0	2.8
$Chi^2 = 8.4$ df = 2 p <.05							

* = p <.05
** = p <.01

1983 Drop-Outs Versus Low and High Achievers

F-tests were computed on all the variables of the Grade five test battery for the three groups defined as drop-outs, low achiever's, and high achiever's at the time of the Grade five testing. The results of the significant F-tests are shown in table 48.

Scheffé's multiple comparison's tests indicated significant differences between drop-outs and low achievers only on the Peabody Picture Vocabulary Test (PPVT) (form A) and the raw difference score ((form B - form A) + 100). Low achievers scored significantly higher than drop-outs on the PPVT (form A) and significantly lower than drop-outs on the PPVT raw difference score.

Both drop-outs and low achievers scored significantly lower than high achievers on the Wide Range Achievement Test reading, spelling, and arithmetic scores, PPVT (forms A and B), Durrell oral reading and listening comprehension and the Children's Personality Questionnaire: B (scholastic mental ability).

Drop-outs scored significantly lower than high Achievers on Durrell Silent Reading, and the Tactual Performance Test (TPT) memory and location scores. Drop-outs scored significantly high on TPT dominant and non-dominant time-per-block scores, indicating that they took longer to perform these tasks.

Low achievers did not differ from high achievers on Durrell Silent Reading or on any aspect of the TPT.

Table 48

Means, Standard Deviations, and Results of Significant F-Tests Comparing 1983 Drop-Outs, Low Achievers, and High Achievers on the 1983 Variables

Variable	1983 Drop-Outs	Low Achievers	High Achievers	F	p
WRAT:					
Reading grade score	6.6a	7.5a	8.7b	13.4	.000
Spelling grade score	6.1a	6.1a	7.6b	17.3	.000
Arithmetic grade score	4.7a	4.8a	5.9b	12.4	.000
PEABODY:					
IQ (A)	102.1a	115.5b	134.8c	23.7	.000
IQ (B)	107.6a	101.6a	137.6b	23.4	.000
*(B-A) + 100	104.8a	91.8b	105.8a	6.5	.004
DURRELL:					
Oral	4.6a	4.6a	5.9b	6.7	.004
Silent	4.3a	4.5ab	5.2b	4.3	.025
Listening comprehension	3.8a	3.9a	5.2b	9.1	.001
CHILDREN'S PERSONALITY QUESTIONNAIRE:					
B (Scholastic Mental Ability)	7.5a	7.4a	9.3b	7.7	.002
TACTUAL PERFORMANCE TEST:					
Memory	5.5a	6.5ab	6.8b	4.8	.014
Location	3.6a	4.6ab	5.7b	4.9	.013
Time per block					
Dominant hand	1.2a	1.0ab	.5b	3.4	.044
Nondominant hand	.7a	.7ab	.4b	4.0	.026

Note: Means bearing the same subscript do not differ significantly. (Multiple comparisons done using Scheffe's multiple comparisons test.)

* = Raw Scores

TACTUAL PERFORMANCE TEST

French Immersion Subjects Versus Drop-Outs

T-tests were performed between these two groups on the time-per-block, memory, and location scores of the Tactual Performance Test (TPT) at the four- and five-year-old Kindergarten and the Grade five testings. The results are shown in table 49. No significant differences were found between the groups at the four- and five-year-old Kindergarten levels. However, all of the t-values were in the expected direction, with drop-outs tending to perform more slowly than French immersion subjects. At the Grade five level, significant differences were found for memory and location scores, with drop-outs performing more poorly on these aspects of the TPT.

Early drop-outs, low achievers, and high achievers

F-tests were performed among the groups of subjects classified as drop-outs, low achievers, and high achievers at the time of the Grade one (1979) testing. The results are shown in table 50. Significant differences were found among the groups on the five-year-old Kindergarten memory score. Scheffe's multiple comparisons test indicated that drop-outs and low achievers performed more poorly than high achievers on this task. The five-year-old Kindergarten dominant time-per-block score approached significance with drop-outs taking more time per block than high achievers.

Late drop-outs, low achievers, and high achievers

F-tests were performed among the groups of subjects classified as late drop-outs (dropped out after 1979 testing) and those classified as low and high achievers at the 1983 testing. The results are shown in table 51. A significant F-value was found for the dominant time-per-block score at the five-year-old Kindergarten level, but no group was found to differ significantly from any other group when Scheffe's tests were performed. However, drop-outs and low achievers tended to perform more poorly than high achievers on this task.

Table 49

T-Test Comparisons Between French Immersion Subjects and Drop-Outs at the Four-Year-Old Kindergarten, Five-Year-Old Kindergarten, and Grade Five Testings on the Tactual Performance Test Scores

Variable	French Immersion		Drop-Outs		t	p
	Mean	SD	Mean	SD		
Four-Year-Old Kindergarten Testing						
Time Per Block:						
Dominant hand	.43	.23	.47	.46	-.5	.611
Nondominant hand	.31	.23	.49	.86	-1.2	.252
Both hands	.23	.19	.40	.85	-1.1	.258
Total	.32	.16	.42	.51	-1.1	.275
Five-Year-Old Kindergarten Testing						
Time Per Block:						
Dominant hand	2.16	1.85	2.63	2.14	-1.1	.270
Nondominant hand	2.21	2.24	2.35	2.45	0.3	.785
Both hands	.96	1.19	1.40	1.96	-1.2	.228
Total	1.87	2.75	1.91	2.09	0.1	.946
Memory	3.59	1.27	3.59	1.18	.03	.979
Location	1.92	1.79	1.76	1.58	.45	.654
Grade Five Testing						
Time Per Block:						
Dominant hand	.77	.38	1.19	1.08	-1.7	.115
Nondominant hand	.54	.26	.66	.41	-1.2	.248
Both hands	.25	.13	.32	.24	-1.2	.263
Total	.51	.20	.67	.35	-1.8	.086
Memory	6.38	1.06	5.61	1.34	2.6	.010
Location	4.71	1.66	3.83	2.09	1.9	.057

Table 50

F-Ratio Comparisons among Early Drop-Outs, Low Achievers, and High Achievers on the Four-Year-Old and Five-Year-Old Kindergarten Tactual Performance Test Scores

Variable	Early Drop-Outs		Low Achievers		High Achievers		F	p
	Mean	SD	Mean	SD	Mean	SD		
Four-Year-Old Kindergarten Testing								
Time Per Block:								
Dominant hand	.4	.6	.5	.4	.4	.2	.34	.716
Nondominant hand	.4	.3	.7	1.2	.3	.2	1.57	.219
Both hands	.3	.3	.5	1.2	.2	.1	1.32	.274
Total	.4	.3	.6	.7	.3	.1	2.09	.134
Five-Year-Old Kindergarten Testing								
Time Per Block:								
Dominant hand	2.9	2.6	2.4	1.5	1.6	1.1	1.80	.070
Nondominant hand	2.3	2.5	1.7	1.0	1.4	1.5	1.30	.282
Both hands	1.4	2.2	1.4	1.8	.5	.4	2.16	.125
Total	1.7	1.7	2.0	2.3	1.0	.6	2.17	.124
Memory	3.4a	1.2	3.0a	1.1	4.3b	1.0	7.06	.002
Location	1.5	1.3	1.7	1.5	2.4	1.9	1.49	.235

Note: Means bearing the same subscript do not differ significantly.

Table 51

F-Ratio Comparisons among Late Drop-Outs, Low Achievers, and High Achievers on the Four-Year-Old and Five-Year-Old Kindergarten Tactual Performance Test Scores

Variable	Late Drop-Outs		Low Achievers		High Achievers		F	p
	Mean	SD	Mean	SD	Mean	SD		
Four-Year-Old Kindergarten Testing								
Time Per Block:								
Dominant hand	.5	.4	.5	.2	.4	.2	.69	.508
Nondominant hand	.6	1.2	.4	.2	.2	.2	.78	.468
Both hands	.5	1.2	.4	.4	.2	.1	.62	.542
Total	.5	.7	.4	.2	.3	.1	.86	.430
Five-Year-Old Kindergarten Testing								
Time Per Block:								
Dominant hand	2.4	1.7	2.8	2.3	1.1	.8	3.48	.041
Nondominant hand	2.4	2.5	3.0	2.9	1.3	1.8	1.44	.250
Both hands	1.4	1.8	1.0	1.1	.4	.3	2.12	.135
Total	2.1	2.4	2.5	3.1	.8	.5	1.97	.153
Memory	3.8	1.2	2.9	.7	3.7	1.3	2.31	.113
Location	2.0	1.8	1.5	1.4	2.5	1.8	.90	.415

1983 drop-outs, low achievers, and high achievers

F-tests were performed among the groups of subjects classified as 1983 drop-outs (those drop-outs who were tested in 1983), low achievers, and high achievers at the time of the 1983 testing. The results are shown in table 52. The F-values for total time-per-block score at the four-year-old Kindergarten level and dominant time-per-block score at the five-year-old Kindergarten level both approached significance. Drop-outs and low achievers tended to take a greater amount of time per block than did high achievers.

DISCRIMINANT FUNCTION ANALYSES

Discriminant function analysis is preferable to the use of univariate F-tests in determining a set of variables or dimensions along which groups can be said to differ. Due to the prevalence of intercorrelations among predictor variables (as is the case in this study), the use of univariate F-tests can lead to confusing and even contradictory interpretations when one is attempting to formulate a "typical" picture of a member of a particular group. This same problem arises when there are more than two groups to be distinguished and all the combinations of two groups found among those several groups are subjected to single discriminant function analyses.

The discriminant function analyses in this study were done using the social science statistical software package SPSS, subprogram DISCRIMINANT, originally documented in release 6 (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975) and updated in releases 7-9 (Hull and Nie, 1981).

Table 52

F-Ratio Comparisons among 1983 Drop-Outs, Low Achievers, and High Achievers on the Four-Year-Old and Five-Year-Old Kindergarten Tactual Performance Test Scores

Variable	1983 Drop-Outs		Low Achievers		High Achievers		F	p
	Mean	SD	Mean	SD	Mean	SD		
Four-Year-Old Kindergarten Testing								
Time Per Block:								
Dominant hand	.4	.2	.5	.2	.4	.2	.82	.450
Nondominant hand	.4	.3	.4	.2	.2	.2	1.72	.194
Both hands	.3	.2	.4	.4	.2	.1	1.82	.176
Total	.4	.1	.4	.2	.3	.1	2.80	.074
Five-Year-Old Kindergarten Testing								
Time Per Block:								
Dominant hand	2.6	2.3	2.8	2.3	1.1	.8	2.84	.071
Nondominant hand	1.9	2.1	3.0	2.9	1.3	1.8	1.62	.213
Both hands	1.4	2.1	1.0	1.1	.4	.3	1.70	.196
Total	2.1	2.6	2.5	3.1	.8	.5	1.81	.177
Memory	3.7	1.1	2.9	.7	3.7	1.3	1.99	.151
Location	1.9	1.6	1.5	1.4	2.5	1.8	1.05	.361

Before the analysis was begun, an attempt was made to select sets of variables from among these in the Early Identification Assessment Battery and the Kindergarten Follow-Up Assessment Battery which were most meaningful and most likely to contribute to the predictive power of a discriminant function. Tatsuoka (1971) recommends that there be at least twice as many subjects as predictor variables in a discriminant function analysis. For the present analyses, the most theoretically meaningful variables were selected from among several highly intercorrelated variables. Variables with high univariate F-values (indicating significant differences between the relevant groups) were preferred to those with low F-values when selecting sets of predictor variables.

A forward stepwise selection technique (Wilks) was chosen as the method of analysis in order to further reduce the variables to be included in the final discriminant functions. Forward stepwise selection involves first selecting the one variable among a set of predictor variables which has the highest value on the selection criterion. This initial variable is then separately paired with every other variable in the analysis to see which pair has the highest value on the selection criterion. Whichever second variable produces the best pair is kept in the discriminant equation. This process continues until no linear combination can be found in which a new variable can enter the equation and meet the minimum requirements for the selection criterion.

The selection criterion for the Wilks method involves an F-ratio which indicates the significance of the amount of separation of group centroids contributed by a variable in addition to the separation due to the variables which are already in the equation. A group centroid is the most typical location of a case from a particular group in the discriminant function space. Group centroids are calculated by finding the mean score for all the members of a group on a particular discriminant function using the standardized discriminant function coefficients and standardized scores on the variables in the function. When there is only one significant function, the group centroids can be simply plotted as points on a line. When there are two significant functions, the centroids can be shown in two-dimensional space by plotting the mean values for each group on each function as X and Y coordinates. SPSS computes orthogonal discriminant functions so that this 90° representation is a meaningful one.

Since an effort to reduce the number of variables in the analysis had already been made, it was decided to maintain the default criterion F-value of 1.0 in order to include a greater number of variables in the final equation rather than restrict them with a more stringent criterion.

Early Identification Assessment Battery Predictor Variables

Reduced sets of variables were selected from among the battery of tests given to the children at the end of their four-year-old Kindergarten year (Early Identification Assessment Battery). Using these sets of variables as predictor variables, discriminant function analyses were performed for French immersion subjects versus all 34 academic drop-outs, early drop-outs

versus low achievers and high achievers, and late drop-outs versus low achievers and high achievers.*

French immersion success versus all academic drop-outs.

A set of 24 predictor variables was selected from the Early Identification Assessment for use in discriminating between these two groups. The means, standard deviations, and F-ratios for these variables are given in table 53.

* Because SPSS employs listwise deletion of cases with missing data, in most cases the group means shown in the tables will differ slightly from those calculated using the entire number of members in a group.

Table 53

Means, Standard Deviations, and F-Ratios for French Immersion Subjects Versus All Academic Drop-Outs on the 24 Selected Predictor Variables From the Early Identification (Four-Year-Old Kindergarten) Assessment Battery

Variable	FI Success		Drop-Outs		t	p
	Mean	SD	Mean	SD		
Family Socieconomic Status	64.1	10.4	55.2	14.0	12.6	.000
WPPSI:						
Verbal IQ	124.3	10.7	112.7	11.9	23.0	.000
Performance IQ	119.9	10.6	107.9	9.2	29.0	.000
Myklebust Pupil Rating Scale (Teachers):						
Verbal	31.4	5.1	26.2	4.6	23.0	.000
Nonverbal	49.7	6.9	43.4	4.9	20.0	.000
Renfrew Action Picture Test:						
Information	26.2	3.1	24.8	3.1	4.0	.049
Raven's Colored Matrices:	18.1	4.7	15.1	4.1	9.5	.003
Circus:						
#2: How much and how many	33.5	3.3	28.8	4.8	33.4	.000
#5: Finding letters and numbers	18.1	1.9	15.7	3.8	18.5	.000
#7: How words sound	41.2	2.2	37.7	3.4	37.3	.000
#9: Listen to the story	18.5	2.7	15.7	3.2	20.9	.000
#13: Think it through	22.4	3.6	18.1	3.6	28.8	.000
Tactual Performance Test:						
Time Per Block						
Dominant hand	.4	.2	.5	.5	.7	.420
Nondominant hand	.3	.2	.5	.9	2.1	.151
Both	.2	.2	.4	.9	3.2	.078
Picture Naming						
# Errors	7.8	3.1	10.2	4.2	10.3	.002

(Continued)

Table 53 (cont)

Variable	FI Success		Drop-Outs		t	p
	Mean	SD	Mean	SD		
Observer Checklist:						
E = Attention	5.2	1.4	4.7	1.6	3.0	.089
G = Self-confidence	5.5	1.6	4.5	1.5	7.8	.006
H = Effort displayed	5.2	1.4	4.5	1.7	4.8	.031
Connors Teacher Questionnaire:						
Inattentive/Positive	14.2	15.4	23.9	17.4	7.9	.006
Hyperactivity	15.1	19.3	27.0	29.2	6.0	.016
* D1	.4	.5	.6	.5	2.9	.092
** D2	.7	.5	.4	.5	7.3	.008
*** D3	.7	.5	.4	.5	8.1	.005

* D1 = Sex

** D2 = Nursery school attendance

*** D3 = Five-year-old Kindergarten teachers' advice regarding French immersion enrolment

The one possible discriminant function discriminated significantly between the two groups, $F(8,97) = 10.0$, $p < .001$. The variables selected for entry into the discriminant function and their standardized discriminant function coefficients are shown in table 54. Family socioeconomic status was found to contribute the most to the discriminant function, followed by WPPSI Performance IQ.

A measure of the overall power of the discriminant function (and thus the predictor battery) to discriminant between the groups was calculated using the following formula taken from Tatsuoka (1971):

$$\tilde{w} = 1 - \frac{N}{(N-k)\ (1+\lambda_1) + (1+\lambda_k)\ + 1}$$

$\tilde{w}$= variance accounted for by the discriminant function(s) N = number of subjects used in the analysis k = number of groups

λ_1 = eigenvalue on first discriminant function

λ_k = eigenvalue on kth discriminant function

$$\tilde{w} = 1 - \frac{106}{(106 - 2)\ (1 + .822)\ + 1} = .44$$

This can be interpreted to mean that 44% of the total variability of the discriminant function is attributable to group differences.

The group centroids are listed below:

GROUP	GROUP CENTROID
French immersion success	.55
Drop-Outs	-1.46

The group means (centroids) show that French immersion success subjects tend to come from higher socioeconomic status families than do drop-outs. French immersion success subjects also have higher performance IQ scores on the WPPSI and better recall, interpretation, and comprehension of oral language (CIR9TOT). They tend to score lower than drop-outs on teacher

Table 54

Standardized Discriminant Function Coefficients for the Variables From the Early Identification Assessment Battery Entering Into the Discriminant Function for French Immersion Subjects and All Academic Drop-Outs

Variable	Standardized D.F. Coefficients
Family Socioeconomic Status	.43
WPPSI:	
Performance IQ	.33
Cirus:	
#9: Listen to the story	.27
Connors Teacher Questionnaire:	
Hyperactivity	-.26
Circus:	
#7: How words sound	.24
#13: Think it through	.23
Myklebust Pupil Rating Scale (Teachers):	
Verbal score	.21
Time Per Block:	
Both hands	-.20

ratings of hyperactivity (CONHYP), and higher on auditory discrimination (CIR7TOT), and problem solving (CIR13TOT). They are rated higher on verbal skills (auditory comprehension and spoken language) by their teachers (VERB) and place more blocks per unit time with both hands on the Tactual Performance Test (TPBBOTH).

SPSS DISCRIMINANT employs listwise deletion of cases with missing data on the variables used to perform the analysis. In this case, 7 of the 113 cases were excluded from the analysis when the discriminant functions were being calculated. Two cases from the French immersion group were deleted and 5 cases from the drop-out group. During the classification stage, however, these cases were brought back into the analysis. This helps to show a more realistic estimate of the percentage correct classification that would be found with a different sample. (When exactly the same cases are used in the classification stage as are used in formulating the discriminant function, the resulting percentage correct classification tends to be inflated).

The results of the classification of all the cases using the discriminant function are shown in table 55. Eighty-nine percent of French immersion success subjects were correctly classified by the discriminant function, and 79% of drop-outs were correctly classified, for an overall correct classification of 86%.

The emergence of family socioeconomic status as such an important discriminating variable was interesting in that it was not found to differentiate between drop-outs and successful French immersion students in the 1979 analysis. It was decided to examine those subjects who dropped out for academic reasons after the 1979 testing (late drop-outs) and those who were considered academic drop-outs for the 1979 analysis (early drop-outs) in two separate discriminant function analyses.

Table 55

Results of the Classification of French Immersion Subjects and All Academic Drop-Outs Using the Discriminant Function Computed with Variables from the Early Identification Assessment Battery

		Predicted Group Membership	
Actual Group	Cases	FI Success	Drop-Outs
FI success	79	70	9
		88.6%	11.4%
Drop-outs	34	7	27
		20.6%	79.4%

Overall correct classification: 85.8%

The first analysis compared early drop-outs (n=17) with those subjects defined as low achievers (n=17) and those defined as high achievers (n=22) at the 1979 testing. The second analysis compared late drop-outs (n=17) with those subjects defined as low achievers (n=10) and those defined as high achievers (n=13) at the 1983 testing.

The predictor variables used to discriminate among these groups were chosen from among the predictor variables used to discriminate between the French immersion subjects and all 34 academic drop-outs (above). Univariate F-tests were performed and variables which showed significant differences among early drop-outs, low achievers, and high achievers and/or late drop-outs, low achievers, and high achievers were used in these analyses. The reduced predictor battery consisted of 17 variables, shown in table 56.

Early drop-outs versus early low achievers and early high achievers. Those subjects who dropped out of French immersion before the 1979 testing were compared with the two groups of children defined as low achievers and high achievers at that time.

The overall predictive power of the two discriminant functions was calculated:

$$\bar{w} = 1 - \frac{51}{(51-3)\ (1+1.98)\ (1+.27)\ +\ 1} = .72$$

This can be interpreted to mean that 72% of the total variability of the two discriminant functions is attributable to group differences. The first function accounts for 88% of this 72%, or about 63% of the total variance. The second function accounts for 12% of this 72%, or about 9% of the total variance. The second function does not account for a statistically significant amount of variance.

Table 56

Means, Standard Deviations, and F-Ratios for Early Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Predictor Variables from the Early Identification Assessment Battery

Variable	1983 Drop-Outs		Low Achievers		High Achievers		F	p
	Mean	SD	Mean	SD	Mean	SD		
Family Socioeconomic Status:	61.3	12.2	57.5	11.5	61.8	12.3	.5	.580
WPPI:								
Verbal IQ	113.3a	11.1	112.4a	7.2	128.9b	10.8	14.9	.000
Performance IQ	108.2a	8.6	115.7a	6.7	123.9b	12.7	10.3	.001
Picture Naming:								
# Errors	9.5a	4.3	11.3a	4.4	6.5b	2.5	7.6	.001
Myklebust Pupil Rating Scale (Teachers):								
Verbal	26.9a	4.8	27.8a	5.7	34.4b	5.4	10.9	.000
Nonverbal	43.8a	6.1	47.3a	4.3	54.6b	6.8	15.1	.000
Renfrew Action Picture Test:								
Information	24.5a	3.2	23.2a	3.7	26.7b	2.9	5.0	.006
Raven's Colored Matrices:	15.4a	4.8	15.9a	4.9	20.3b	5.0	5.4	.010
Circus:								
#2: How much and how many	28.3a	3.8	29.6a	4.0	34.7b	3.8	14.4	.000
#5: Finding letters and numbers	14.7a	4.1	16.7a	3.0	18.6b	1.4	8.1	.003
#7: How words sound	37.1a	3.7	37.8a	3.1	42.3b	1.9	18.2	.000
#9: Listen to the story	14.9a	3.5	17.3a	2.4	19.4b	2.9	9.9	.000
#13: Think it through	17.9a	4.1	20.2a	5.7	24.0b	3.6	9.5	.000

(Continued)

Table 56 (cont)

Variable	1983 Drop-Outs		Low Achievers		High Achievers		F	p
	Mean	SD	Mean	SD	Mean	SD		
Connors Teacher Questionnaire:								
Inattentive/ Passive	23.3a	18.6	27.8a	24.7	7.1b	9.4	7.2	.002
Observer Checklist:								
H - Effort displayed	4.2a	1.2	4.2a	1.2	5.7b	1.0	11.0	.000
* D1	.6	.5	.4	.5	.8	.4	2.8	.070
** D2	.4	.5	.5	.5	.7	.5	2.5	.100

* D1 = Nursery school attendance

** D2 = Four-year-old Kindergarten teachers' advice regarding French immersion enrolment

Note: Multiple comparisons done using Scheffe's procedure.
Means bearing the same subscript do not differ significantly.

The 17 predictor variables chosen from the four-year-old Kindergarten assessment battery for use in the discriminant function analysis among early drop-outs, low achievers, and high achievers are shown in table 56, along with the means and standard deviations for each group or each variable and F-ratio comparisons of the three groups.

The variables which met the entry criteria for the discriminant function are shown in table 57. The standardized discriminant function coefficients are shown in descending order of importance for the first discriminant function which accounts for the greater part of the variance. The standardized discriminant coefficients indicate the relative contribution of each variable to the discriminant function. It can be seen that the variable CIR7TOT (auditory discrimination) contributes the most to function one, followed closely by OBSH (effort displayed), RENINF (information score on the Renfrew Action Picture Test) and WPPSI Verbal IQ. The second discriminant function is not statistically significant; however, the one variable which contributes the most to this function is CIR9TOT (comprehension, interpretation, and recall of oral language).

The group centroids for the three groups on the two functions are listed in table 58. F-ratios computed between the pairs of groups indicated that within this two-dimensional discriminant space, drop-outs and low achievers were both differentiated significantly from high achievers, but not from each other (see table 59).

Table 57

Standardized Discriminant Function Coefficients for the Variables From the Early Identification Assessment Battery Entering Into the 2 Discriminant Functions for Early Drop-Outs, Low Achievers, and High Achievers

Variable	Standardized D.F. Coefficients	
	Function I	Function II
Circus:		
#7: How words sound	.50	.53
Observer checklist:		
H - Effort displayed	.45	.36
Renfrew Action Picture Test:		
Information	.43	.50
WPPSI:		
Verbal IQ	.42	.39
Family Socioeconomic Status	-.28	.37
Myklebust Pupil Rating Scale (Teachers):		
Nonverbal score	.24	-.78
Circus:		
#9: Listen to the story	-.10	-1.20

Table 58

Group Centroids for the Early Drop-Outs, Low Achievers, and High Achievers on the 2 Discriminant Functions Computed Using Variables From the Early Identification Assessment Battery

Group	Function I	Function II
Drop-outs	-1.16	.61
Low achievers	-1.22	-.73
High achievers	1.57	-.01

Table 59

F-Ratios Between the Pairs of Groups for the Early Drop-Outs, Low Achievers, and High Achievers (Early Identification Assessment Battery Discriminant Functions)

Drop-outs/Low achievers	F (7,42) = 1.6	(NS)
Drop-outs/High achievers	F (7,42) = 9.1	$p < .001$
Low achievers/High achievers	F (7,42) = 8.5	$p < .001$

NS = Not statistically significant ($p > .05$)

It appears that function I serves to discriminate between drop-outs and high achievers and between low and high achievers. Function II, though not significant, attempts to discriminate between drop-outs and low achievers. The positions of drop-outs with respect to low achievers on the first function, and of high achievers with respect to both drop-outs and low achievers on the second function must be interpreted with this in mind.

Function I. High achievers are differentiated from drop-outs and low achievers by this function. The most important discriminating variable is CIR7TOT (auditory discrimination). High achievers score significantly higher on this test (indicating better auditory discrimination abilities) than both drop-outs and low achievers. High achievers also score higher than both drop-outs and low achievers on OBSH (effort displayed), information score on the Renfrew Action Picture Test, and Verbal IQ on the WPPSI.

Function II. This function attempts to discriminate between drop-outs and low achievers, but does not do so significantly. The most important variable is CIR9TOT (comprehension, interpretation, and recall of oral language). This variable has a negative weighting, indicating that low achievers score higher on this variable than do drop-outs. Low achievers are thus represented as having better comprehension, interpretation, and recall of oral language than drop-outs.

Although high achievers are positioned by their group centroids between drop-outs and low achievers on this function, this should not be interpreted to mean that their scores on the discriminant function variables are between those of drop-outs and those of low achievers, since the purpose of this function is to discriminate between drop-outs and low achievers, and the position of high achievers is not meaningful.

Because of listwise deletion of cases with missing data on the discriminating variables, 5 of the 56 cases were excluded from this analysis when the discriminant functions were being calculated. One case from the drop-out group was deleted, and four cases from the low achiever group were deleted. These cases were re-entered for the classification stage. The results of the classification of all the cases using both discriminant functions is shown in table 60.

Sixty-five percent of drop-outs were correctly classified, as were 65% of low achievers and 91% of high achievers, for an overall correct classification of 75%. As one would expect, the greatest percentage of classification errors took place between the drop-outs and low achievers. Thirty-five percent of drop-outs were classified as low achievers and 29% of low achievers were classified as drop-outs.

Late drop-outs versus late low achievers and late high achievers. Those subjects who dropped out of French immersion after the 1979 testing were compared with the two groups of children defined as low achievers and high achievers at the 1983 testing.

The overall predictive power of the two discriminant functions was calculated:

$$\tilde{w} = 1 - \frac{37}{(37-3)\ (1+3.5)\ (1+.4) + 1} = .83$$

This can be interpreted to mean that 83% of the total variability of the two discriminant functions is attributable to group differences. The first function accounts for 89% of the 83%, or about 74% of the total variance. The second function accounts for 11% of this 83%, or about 9% of the total variance. The second function accounts for a marginally significant amount of variance.

The means, standard deviations, and F-ratio comparisons for the late drop-outs, low achievers, and high achievers on the 17 predictor variables from the four-year-old Kindergarten assessment battery are shown in table 61. The variables which met the entry criteria for the discriminant functions are shown in table 62. The standardized discriminant function coefficients are shown in descending order of importance for the first function which accounts for the greater proportion of the overall variance.

WPPSI Performance IQ contributes the most to function I, followed by CIR13TOT (problem-solving ability), FIADVIS (four-year-old Kindergarten teachers' advice regarding French immersion enrolment), VERB (verbal score on the Myklebust teacher rating scale - auditory comprehension and spoken language), SESFAM (family socioeconomic status), and WPPSI verbal IQ.

The only variable which contributes appreciably to the second discriminant function is family socioeconomic status.

The group centroids are listed in table 63. F-ratios computed between the pairs of groups indicated that within this two-dimensional discriminant space each group was differentiated significantly from every other group (see table 64).

Function I serves to discriminate among all three groups, but is most effective in discriminating between drop-outs and high achievers and between low achievers and high achievers. Function II serves mainly to discriminate between drop-outs and low achievers. The positions of the three groups on function I are fairly representative of the actual mean scores on the discriminating variables, with drop-outs tending to score lower than low achievers (though usually not significantly lower) and both drop-outs and low achievers scoring significantly lower than high achievers. The position of high achievers on function II is not representative of that group's scores on the discriminating variables.

Function I. The variable which contributes most to the discriminating power of this function is WPPSI Performance IQ. Drop-outs score significantly lower than high achievers. All three groups are differentiated by this variable only. Drop-outs and low achievers score lower than high achievers on CIR13TOT (problem-solving ability), and four-year-old Kindergarten teachers were less likely to recommend French immersion enrolment for drop-outs and low achievers than they were for high achievers.

Table 60

Results of the Classification of Early Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables from the Early Identification Assessment Battery

		Predicted Group Membership		
Actual Group	# Cases	Drop-Outs	Low Achievers	High Achievers
Drop-outs	17	11	6	0
		64.7%	35.3%	0%
Low achievers	17	5	11	1
		29.4%	64.7%	5.9%
High achievers	22	2	0	20
		9.1%	0%	90.9%

Overall correct classification: 75.0%

Table 61

Means, Standard Deviations, and F-Ratios for Late Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Predictor Variables from the Early Identification Assessment Battery

Variable	1983 Drop-Outs		Low Achievers		High Achievers		F	p
	Mean	SD	Mean	SD	Mean	SD		
Family socioeconomic status:	48.7a	13.1	66.5b	8.9	65.4b	7.6	12.1	.000
WPPSI:								
Verbal IQ	112.1a	13.0	116.5a	7.0	133.9b	8.3	17.0	.000
Performance IQ	107.6a	10.1	116.8b	5.9	129.7c	8.9	21.7	.000
Connors Teacher Questionnaire:								
Inattentive/ Passive	24.2	16.1	15.6	13.0	13.7	14.5	1.9	.161
Picture Naming:								
Errors	11.1a	3.9	9.6ab	2.1	7.3b	2.2	5.6	.008
Myklebust Pupil Rating Scale (Teachers):								
Verbal	25.4a	4.4	28.6a	3.6	35.5b	5.2	17.2	.000
Nonverbal	43.0a	3.4	46.1a	7.0	54.4b	7.5	12.5	.000
Renfrew Action Picture Test:								
Information	25.2	3.0	25.6	3.2	26.8	1.9	1.2	.315
Raven's Colored Matrices:	14.7a	3.3	15.8a	4.5	20.9b	5.1	7.7	.002
Circus:								
#2: How much and how many	29.4a	5.7	31.6ab	3.0	35.5b	2.8	7.5	.002
#5: Finding letters and numbers	16.8	3.2	17.2	3.2	18.8	.8	2.1	.141
#7: How words sound	38.4a	3.1	40.2a	1.6	42.9b	1.2	14.7	.000
#9: Listen to the story	16.4a	2.7	17.4ab	4.0	19.4b	2.4	3.4	.046
#13: Think it through	18.4a	3.1	19.8a	3.0	24.8b	2.8	16.9	.000

(Continued)

Table 61 (cont)

Variable	1983 Drop-Outs		Low Achievers		High Achievers		F	p
	Mean	SD	Mean	SD	Mean	SD		
Observer Checklist:								
H - Effort displayed	4.8	2.0	4.9	1.4	5.1	1.3	.1	.902
* D1	.2	.4	.6	.5	.6	.5	2.9	.066
** D2	.4a	.5	.5a	.5	.8b	.4	3.8	.031

Note: Multiple comparisons done using Scheffes procedure. Means bearing same subscript do not differ significantly

* = D1 Nursery school attendance

** = D2 Four-year-old Kindergarten teacher' advice regarding French immersion enrolment

Table 62

Standardized Discriminant Function Coefficients for the Variables From the Early Identification Assessment Battery Entering Into the 2 Discriminant Functions for Late Drop-Outs, Low Achievers, and High Achievers

Variable	Standardized D.F. Coefficients Function I	Function II
WPPSI:		
Performance IQ	.51	.14
Circus:		
#13: Think it through	.37	-.04
* D2	.36	
Myklebust Pupil Rating Scale (Teachers)		
Verbal score	.31	-.20
Family Socioeconomic Status	.29	1.01
WPPSI:		
Verbal IQ	.26	-.65

*D2 = Five-year-old Kindergarten teachers' advice regarding French immersion enrolment

Table 63

Group Centroids for the Late Drop-Outs, Low Achievers, and High Achievers on the 2 Discriminant Functions Computed Using Variables from the Early Identification Assessment Battery

Group	Function I	Function II
Drop-outs	-1.91	-.44
Low achievers	-.27	1.01
High achievers	2.27	-.31

Table 64

F-Ratios Between the Pairs of Groups for the Late Drop-Outs, Low Achievers, and High Achievers (Early Identification Assessment Battery Discriminant Functions)

Drop-outs/Low achievers	$F(6,29) = 4.0$	$p < .01$
Drop-outs/High achievers	$F(6,29) = 16.8$	$p < .001$
Low achievers/High achievers	$F(6,29) = 6.6$	$p < .001$

Function II. This function serves to discriminate between drop-outs and low achievers, and is marginally significant. The most important variable is SESFAM (family socioeconomic status), indicating that drop-outs tend to come from families of significantly lower socioeconomic status than those of low achievers. The position of high achievers on function II is not an accurate reflection of their scores in relation to drop-outs and low achievers on socioeconomic status. In fact, the raw data means show that high achievers and low achievers are of similar socioeconomic status.

Because of listwise deletion of cases with missing values on the variables used to perform the analysis, 3 of the 40 cases were excluded from this analysis. All 3 were from the drop-out group. During the classification stage, all 40 cases were used. The results of the classification of all the cases using the two discriminant functions is shown in table 65.

Seventy-one percent of late drop-outs were correctly classified, as were 90% of low achievers and 85% of high achievers, for an overall correct classification of 80%. The greatest percentage of classification errors took place in the drop-out group, with 29% being classified as low achievers.

Table 65

Results of the Classification of Late Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables from the Early Identification Assessment Battery

		Predicted Group Membership		
Actual Group	# Cases	Drop-Outs	Low Achievers	High Achievers
Drop-outs	17	12	5	0
		70.6%	29.4%	0%
Low achievers	10	0	9	1
		0%	90.0%	10.0%
High achievers	13	0	2	11
		0%	15.4%	84.6%

Overall correct classification: 80.0%

Five-Year-Old Kindergarten Follow-up Assessment Battery Predictor Variables

Reduced sets of variables were selected from among the battery of tests given to the children at the end of their five-year-old Kindergarten year (Kindergarten Follow-up Assessment Battery). Using these sets of variables along with several descriptive and demographic variables from the Early Identification Assessment Battery, discriminant function analyses were performed for French immersion subjects versus all academic drop-outs, early drop-outs versus low achievers and high achievers, and late drop-outs versus low achievers and high achievers.

French immersion success versus all academic drop-outs. A set of 22 predictor variables was selected for use in discriminating between these two groups. The means, standard deviations, and F-ratios for the two groups on these variables are given in table 66. The one possible discriminant function differentiated significantly between the two groups, $F\ (10,88) = 8.4$, $p < .001$.

The variables which met the criteria for entry into the discriminant functions are shown in table 67. XWRAAG (arithmetic grade score on the Wide Range Achievement Test) contributed the most to the discriminant function, followed by XRECFI (five-year-old Kindergarten teachers' advice on French immersion enrolment, OBSE (attention), and OBSB (manual dexterity).

The overall predictive power of the discriminant function was calculated:

$$\bar{w} = 1 - \frac{99}{(99-2)\ (1+.96)\ +1} = .48$$

This indicates that 48% of the total variability of the discriminant function is attributable to group differences.

The group centroids are listed below:

GROUP	GROUP CENTROID
French Immersion	.61
Drop-Outs	-1.54

Table 66

Means, Standard Deviations, and F-Ratios for French Immersion Subjects Versus All Academic Drop-Outs on the 22 Selected Predictor Variables From the Kindergarten Follow-up Assessment Battery (Five-Year-Old Kindergarten Battery)

Variable	FI Success Mean	FI Success SD	Drop-Outs Mean	Drop-Outs SD	F	p
Family Socioeconomic Status:	63.9	10.6	56.6	13.8	8.0	.006
WPPSI:						
Verbal IQ	125.1	10.2	112.9	11.5	26.4	.000
Performance IQ	120.5	10.8	109.4	9.9	21.9	.000
French Comprehension Test, Primer: (RACO)	26.8	6.8	23.9	6.1	3.9	.052
Peabody:						
IQ	121.2	12.1	112.7	13.2	9.5	.003
Renfrew Action Picture Test:						
Information	25.3	3.4	23.7	3.4	4.6	.035
Word Segmenting:						
Total # words segmented - syllable boundaries	11.6	2.5	10.3	2.8	4.8	.031
Picture Naming (French):						
Errors	92.0	3.3	89.5	3.4	11.0	.001
WRAT:						
Reading grade score	1.6	1.0	1.2	.2	5.1	.026
Spelling grade score	1.3	.3	1.1	.2	6.4	.013
Arithmetic grade score	1.7	.3	1.2	.4	41.9	.000
Letter Naming (French):	8.5	4.3	5.7	4.5	8.8	.004
Circus:						
#9: Listen to the story	21.5	2.7	19.9	2.0	9.1	.003
#13: Think it through	25.9	2.5	24.1	2.7	9.9	.002

(Continued)

Table 66 (cont)

Variable	FI Success Mean	FI Success SD	Drop-Outs Mean	Drop-Outs SD	F	p
Observer Checklist						
B - Performance Rate	5.8	1.5	4.1	1.5	25.3	.000
E - Attention	5.6	1.5	4.4	1.4	12.1	.001
H - Effort displayed	6.4	2.6	5.1	2.7	5.2	.024
Connors Teacher Questionnaire:						
Inattentive/Passive	13.3	17.7	38.9	26.7	31.0	.000
Hyperactivity	14.6	20.9	27.6	28.1	6.4	.013
* D1	.4	.5	.6	.5	2.8	.100
** D2	.7	.5	.5	.5	3.3	.071
*** D3	1.0	.2	.6	.5	30.1	.000

* D1 = Sex

** D2 = Nursery school attendance

*** D3 = Five-year-old Kindergarten teachers' advice regarding French immersion enrolment

Table 67

Standardized Discriminant Function Coefficients for the Variables From the Kindergarten Follow-Up Assessment Battery Entering Into the Discriminant Function for French Immersion Subjects and All Academic Drop-Outs

Variable	Standardized D.F. Coefficients Function I
WRAT:	
Arithmetic grade score	.49
** D3:	.34
Observer Checklist:	
E - Attention	.33
B - Performance rate	.31
WRAT:	
Spelling grade score	-.26
French Comprehension Test, Primer:	
Raw	-.25
Family Socioeconomic Status:	.24
* D1:	-.24
WPPSI:	
Verbal IQ	.20
Performance IQ	.19

* D1 = Sex

** D3 = Five-year-old Kindergarten teachers' advice regarding French immersion enrolment

French immersion subjects scored higher than drop-outs on the WRAT arithmetic grade score; were more likely to be recommended for the French immersion program by their five-year-old Kindergarten teachers; and scored higher on examiner ratings of attention and manual dexterity than drop-outs.

Because of listwise deletion of cases with missing data on the variables in the analysis, 13 of the 112 cases were excluded from this analysis. Eight cases were from the French immersion success group and 5 cases were from the drop-out group. All 112 cases were used in the classification of cases, shown in table 68.

Eighty-seven percent of French immersion subjects were correctly classified, as were 82% of drop-outs, for an overall correct classification of 86%.

Early drop-outs who were low achievers or high achievers and late drop-outs who were low achievers or high achievers were compared in two separate discriminant function analyses using a reduced set of variables chosen from among the predictor variables used to discriminate between the 79 French immersion subjects and the 34 academic drop-outs. Univariate F-tests were performed and variables which showed significant differences among early drop-outs who were low achievers or high achievers and late drop-outs who were low achievers or high achievers were used in these analyses. The 17 variables chosen are shown in table 69.

Early drop-outs versus early low achievers and early high achievers. The overall predictive power of the two discriminant functions was calculated:

$$\tilde{w} = 1 - \frac{50}{(50-3)\ (1+3.85)\ (1+.41) + 1} = .84$$

Table 68

Results of the Classification of French Immersion Subjects and All Academic Drop-Outs Using the Discriminant Functions Computed with Variables from the Kindergarten Follow-Up Assessment Battery

		Predicted Group Membership	
Actual Group	# Cases	FI Success	Drop-Outs
FI success	79	69	10
		87.3%	12.7%
Drop-outs	33	6	27
		18.2%	81.8%

Overall correct classification: 85.71%

Table 69

Means, Standard Deviations, and F-Ratios for Early Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Predictor Variables from the Kindergarten Follow-Up Assessment Battery

	Early Drop-Outs		Low Achievers		High Achievers			
Variable	Mean	SD	Mean	SD	Mean	SD	F	p
Family Socioeconomic Status	60.8	12.5	59.2	11.1	61.8	12.3	.2	.820
WPPSI:								
Verbal IQ	113.0	11.1	109.9	8.6	128.9	10.8	17.8	.000
Performance IQ	110.6	9.5	113.1	10.1	123.9	12.7	7.3	.001
French Comprehension Test, Primer:								
Raw	22.8	4.2	19.3	5.9	29.4	7.2	12.7	.001
Peabody:								
IQ	114.4	14.0	108.6	16.8	124.0	11.8	5.5	.007
Renfrew Action Picture Test:								
Information	22.9	3.0	23.1	4.1	25.9	3.4	4.3	.019
Picture Naming (French):								
Errors	88.1	2.9	89.3	3.4	93.9	2.9	18.2	.000
WRAT:								
Reading grade score	1.1	.3	1.2	.4	1.8	.6	10.9	.000
Spelling grade score	1.1	.1	1.1	.2	1.4	.4	6.0	.005
Arithmetic grade score	1.1	.3	1.2	.5	1.8	.3	25.6	.000
Circus:								
#9: Listen to the story	19.6	2.0	18.7	2.6	22.4	3.2	8.5	.001
#13: Think it through	24.4	2.8	22.6	3.6	26.3	2.8	6.7	.003
Observer Checklist:								
B - Performance rate	4.1	1.0	4.6	2.1	5.9	1.5	6.2	.004
H - Effort displayed	4.7	2.5	5.3	3.0	7.4	2.3	5.4	.008
Connors Teacher Questionnaire:								
Inattentive/Passive	37.6	26.3	36.3	30.6	6.7	11.1	11.2	.001
Time Per Block:								
Dominant hand	2.8	2.5	2.5	1.6	1.6	1.1	2.5	.092
* D1	.5	.5	.8	.4	1.0	0.0	8.6	.001

* D1 = Five-year-old Kindergarten teachers' advice regarding French immersion enrolment

Thus, 84% of the total variability of the two discriminant functions is attributable to group differences. Function I accounts for 90% of this 84%, or about 76% of the total variance. Function II does not account for a statistically significant amount of variance. The 17 predictor variables chosen from the five-year-old Kindergarten assessment battery for use in the discriminant function analysis among early drop-outs, low achievers, and high achievers are shown in table 69, along with the means and standard deviations for each group on each variable and F-ratio comparisons of the three groups.

The variables which met the criteria for entry into the discriminant functions are shown in table 70. XOBSH (effort displayed) contributes the most to function I, followed by XWRAAG (WRAT arithmetic grade score), XOBSB (performance rate), and XCONIP (inattentive/passive behaviour on the Connors Teacher Rating Scale).

Five-year-old Kindergarten teachers' advice regarding French immersion enrolment contributes the most to function II, followed closely by the XFRCOMPR (French Comprehension Test). However, these must be interpreted carefully since function II is not significant.

The group centroids are listed in table 71. F-ratios computed between the pairs of groups indicated that within this two-dimensional discriminant space, drop-outs and low achievers were both differentiated significantly from high achievers, but not from each other (see table 72).

It appears that function I serves mostly to discriminate between drop-outs and high achievers and between low achievers and high achievers. Function II, though not significant, attempts to discriminate between drop-outs and low achievers. The positions of drop-outs with respect to low achievers on function I and of high achievers with respect to both drop-outs and low achievers on function II must be interpreted with this in mind.

Table 70

Standardized Discriminant Function Coefficients for the Variables From the Kindergarten Follow-Up Assessment Battery Entering Into the 2 Discriminant Functions for Early Drop-Outs, Low Achievers, and High Achievers

Variable	Standardized D.F. Coefficients Function I	Function II
Observer Checklist:		
H - Effort displayed	.57	.08
WRAT:		
Arithmetic grade score	.54	.14
Observer checklist:		
B - Performance rate	-.49	.00
Connors Teacher Questionnaire:		
Inattentive - passive	-.48	.65
Time Per Block:		
Dominant hand	-.34	-.38
French Comprehension Test, Primer:		
Raw	.33	-.82
WPPSI:		
Verbal IQ	.32	.27
Renfrew Action Picture Test:		
Information	.31	.14
Circus:		
#9: Listen to the story	.26	-.21
Picture Naming (French):		
Errors	.24	.70
* D1	-.14	.84

* D1 = Five-year-old Kindergarten teachers' advice regarding French immersion enrolment

Table 71

Group Centroids for the Early Drop-Outs, Low Achievers, and High Achievers on the 2 Discriminant Functions Computed Using Variables From the Kindergarten Follow-Up Assessment Battery

Group	Function I	Function II
Early Drop-Outs	-1.61	-.85
Low achievers	-1.76	.81
High achievers	2.14	.02

Table 72

F-Ratios Between the Pairs of Groups for the Early Drop-Outs, Low Achievers, and High Achievers (Kindergarten Follow-Up Assessment Battery Discriminant Functions)

Drop-outs/Low achievers	F (11,37) = 1.4	(NS)
Drop-outs/High achivers	F (11,37) = 9.1	p <.001
Low achievers/High achievers	F (11,37) = 9.7	p <.001

NS = Not statistically significant

Function I. High achievers are differentiated from drop-outs and low achievers by this function. The most important discriminating variables are effort displayed (OBSH) and arithmetic grade score on the WRAT. High achievers scored significantly higher on these variables than did drop-outs or low achievers.

The discriminant function coefficient for OBSB has a negative weighting which would suggest that drop-outs and low achievers were rated higher on manual dexterity than were high achievers. This neither makes sense intuitively nor is it substantiated by the means for the groups which indicate just the opposite: that high achievers were rated higher on manual dexterity than are low achievers and drop-outs. The reason for this discrepancy may be due to the fact that, according to Tatsuoka (1971), often only the variables with the very highest weightings in a discriminant function are truly interpretable.

Function II. This function attempts to discriminate between drop-outs and low achievers, but does not do so significantly. The most important variable is five-year-old Kindergarten teachers' advice regarding French immersion enrolment, followed by the French Comprehension Test. It would appear that five-year-old Kindergarten teachers were more likely to advise French immersion for low achievers than for drop-outs, and that drop-outs scored higher on the French Comprehension Test than did low achievers. However, neither of these differences were statistically significant. The position of high achievers on function II should not be interpreted to mean that they scored between drop-outs and low achievers on the discriminating variables.

Because of listwise deletion of cases with missing data on the variables used to perform the analysis, 6 of the 56 cases were excluded from the analysis. Three were from the drop-out group and 3 were from the low achiever group. These cases were brought back into the analysis for the classification stage.

The results of the classification are shown in table 73. Seventy-six percent of drop-outs were correctly classified, as were 59% of low achievers and 100% of high achievers, for an overall correct classification of 80%.

Late drop-outs versus late low achievers and late high achievers. The overall predictive power of the two discriminant functions was calculated:

$$\hat{w} = 1 - \frac{38}{(38-3)\ (1+2.35)\ (1+.65) + 1} = .80$$

Thus, 80% of the total variability of the two discriminant functions is attributable to group differences. Function I accounts for 78% of this 80%, or about 62% of the total variance. Function II accounts for 22% of this 80% or about 18% of the total variance. Both functions account for a statistically significant amount of variance. The means, standard deviations, and F-ratio comparisons for the late drop-outs, low achievers, and high achievers on the 17 predictor variables from the five-year-old Kindergarten assessment battery are shown in table 74.

The variables which met the criteria for entry into the discriminant functions are shown in table 75. WPPSI Performance IQ and Verbal IQ contribute the most to function I. WRAT spelling grade score and family socioeconomic status contribute the most to function II.

The group centroids are listed in table 76. F-ratios computed between the pairs of groups indicated that within the two-dimensional discriminant space, every group was significantly differentiated from every other group (see table 77).

Table 73

Results of the Classification of Early Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables from the Kindergarten Follow-Up Assessment Battery

		Predicted Group Membership		
Actual Group	# Cases	Drop-Outs	Low Achievers	High Achievers
Drop-outs	17	13	3	1
		76.5%	17.6%	5.9%
Low achievers	17	7	10	0
		41.2%	58.8%	0.0%
High achievers	22	0	0	22
		0.0%	0.0%	100.0%

Overall correct classification: 80.4%

Table 74

Means, Standard Deviations, and F-Ratios for Late Drop-Outs, Low Achievers, and High Achievers on the 17 Selected Variables from the Kindergarten Follow-Up Assessment Battery

	Early Drop-Outs		Low Achievers		High Achievers			
Variable	Mean	SD	Mean	SD	Mean	SD	F	p
Family Socioeconomic Status:	51.9	13.8	66.5	8.9	65.5	7.6	7.7	.002
WPPSI:								
Verbal IQ	112.5	12.0	116.5	7.0	133.9	8.3	18.3	.000
Performance IQ	108.3	10.1	116.8	5.9	129.7	8.9	20.8	.000
French Comprehension Test, Primer:								
Raw	25.2	7.3	22.1	6.9	28.2	6.7	2.1	.135
Peabody:								
IQ	110.5	12.3	112.3	8.9	128.5	8.2	12.4	.000
Renfrew Action Picture Test:								
Information	24.5	3.6	23.2	3.5	26.6	1.7	3.8	.032
Picture Naming (French)								
Errors	90.9	3.2	89.8	5.0	92.6	2.1	2.0	.056
WRAT:								
Reading grade score	1.2	.3	1.2	.1	2.4	2.2	3.9	.030
Spelling grade score	1.1	.2	1.2	.2	1.5	.4	6.7	.004
Arithmetic grade score	1.2	.4	1.4	.5	1.8	.2	8.7	.001
Circus:								
#9: Listen to the story	20.1	1.9	19.6	2.3	21.7	3.9	1.8	.176
#13: Think it through	23.7	2.7	25.2	2.0	27.1	2.4	6.6	.004
Observer Checklist:								
B - Performance rate	4.1	1.8	5.2	1.1	6.7	1.4	10.4	.000
H - Effort displayed	5.3	3.0	4.8	2.6	7.3	2.4	3.0	.064
Connors Teacher Questionnaire:								
Inattentive/Passive	41.3	27.3	28.2	10.7	6.3	10.2	11.9	.000
Time Per Block:								
Dominant hand	2.5	1.7	2.8	2.3	1.1	.8	3.5	.041
* D1	.7	.5	.8	.4	1.0	0.0	2.0	.150

* D1 = Five-year-old Kindergarten teachers' advice regarding French immersion enrolment

Table 75

Standardized Discriminant Function Coefficients for the Variables From the Kindergarten Follow-up Assessment Battery Entering Into the 2 Discriminant Functions for Late Drop-Outs, Low Achievers, and High Achievers

Variable	Standardized D.F. Coefficients	
	Function I	Function II
WPPSI:		
Performance IQ	.53	.54
Verbal IQ	.50	-.39
French Comprehension Test, Primer:		
Raw	-.31	-.60
Renfrew Action Picture Test:		
Information	.30	-.32
Circus:		
#13: Think it through	.28	.49
Time Per Block:		
Dominant hand	-.27	.42
Family Socioeconomic Status:	.18	.64
WRAT:		
Spelling grade score	.07	-.65

Table 76

Group Centroids for the Late Drop-Outs, Low Achievers, and High Achievers on the 2 Discriminant Functions Computed Using Variables From the Kindergarten Follow-up Assessment Battery

Group	Function I	Function II
Late drop-outs	-1.45	-.58
Low achievers	-.36	1.28
High achievers	1.95	-.32

Table 77

F-Ratios Between the Pairs of Groups for the Late Drop-Outs, Low Achievers, and High Achievers (Kindergarten Follow-Up Assessment Battery Discriminant Functions)

Drop-outs/Low achievers	F (8,28) = 2.8	p <.05
Drop-outs/High achievers	F (8,28) = 8.1	p <.001
Low achievers/High achievers	F (8,28) = 4.5	p <.01

It appears that function I serves to discriminate among all three groups, especially between drop-outs and high achievers. Function II serves partly to discriminate between drop-outs and low achievers and partly between low achievers and high achievers.

Function I. WPPSI Performance IQ differentiates between all three pairs of groups. Drop-outs scored significantly lower on Performance IQ than do low achievers who scored significantly lower than high achievers. Drop-outs and low achievers scored significantly lower on Verbal IQ than did high achievers.

Function II. Drop-outs and low achievers are discriminated on this function by family socioeconomic status. Low achievers come from families of higher socioeconomic status than those of drop-outs. Low achievers and high achievers are discriminated by WRAT spelling grade score and the French Comprehension Test. Low achievers scored significantly lower than high achievers on these tests.

Because of listwise deletion of cases with missing data on the variables used to perform the analysis, 2 of the 40 cases were excluded from the analysis. Both cases were from the drop-out group. These cases were brought back into the analysis at the classification stage. The results of the classification are shown in table 78. Seventy-one percent of drop-outs were correctly classified, as were 100% of low achievers and 92% of high achievers, for an overall correct classification of 85%.

Table 78

Results of the Classification of Late Drop-Outs, Low Achievers, and High Achievers Using the Discriminant Functions Computed with Variables from the Kindergarten Follow-up Assessment Battery

		Predicted Group Membership		
Actual Group	# Cases	Drop-Outs	Low Achievers	High Achievers
Drop-outs	17	12	3	2
		70.6%	17.6%	11.8%
Low achievers	10	0	10	0
		0.0%	100.0%	0.0%
High achievers	13	0	1	12
		0.0%	7.7%	92.3%

Overall correct classification: 85.00%

FOLLOW-UP TESTING OF SUBJECTS FROM THE 1974-1975 STUDIES

Introduction

The results of the first two years of investigation suggested that the learning disability experienced by some children in primary French immersion was specific to the second language situation only and that it was explained by a maturational lag which appears to resolve by age nine or ten. With this in mind several of the children investigated in those studies were reassessed. Primarily, particular attention was paid to the progress of the children in English language programs who dropped out of early French immersion due to learning disability with the prediction that they would progress normally since their early learning difficulty was specific to the second language situation and not a manifestation of a general language deficit. Secondly, it was hoped that several of the early drop-outs would opt for a later immersion program. If they did, the prediction would be that they would be successful since the maturational lag would have resolved.

The Sample

Four groups of subjects involved in our French immersion studies conducted in 1974 and 1975 were contacted towards the end of 1982. These four groups were: the original 32 children who had been referred to the Royal Ottawa Hospital Neuropsychology Laboratory for problems in French immersion (FI difficulty group); the original 8 children who were described as not experiencing difficulties in French immersion (FI success); the 16 children who had dropped out of French immersion (from the cross-validation study) (drop-outs); and the 16 children who served as a control group who were not experiencing difficulties in French immersion (from the cross-validation study) (controls).

Of the group of 32 who were experiencing difficulties, 17 came in for testing, 6 did not consent to testing, 4 had moved away, 3 could not be located, and 2 were attending schools out of town. Of the group of 8 who were not experiencing difficulties, 3 came in for testing, 3 had moved away, 1 did not consent to testing, and 1 was attending school out of town. Of the 16 drop-outs, 5 came in for testing, 6 had moved, and 5 did not consent to testing. Of the 16 controls, 6 came in for testing, 6 had moved, and 4 did not consent to testing.

Altogether, 31 subjects returned for testing in the spring of 1983. The test battery included an IQ test (WISC-R or WAIS-R depending on the age of the subject), Wide Range Achievement Test, Peabody Picture Vocabulary Test, Tactual Performance Test, Test de Rendement en Francais (for those in RI), and the High School Personality Questionnaire (HSPQ, 1968). The subjects were also asked several questions about school, and about their attitudes toward and use of the French language.

T-Test Comparisons Between Drop-Outs and French Immersion Success Subjects

For the purpose of a general comparison between the drop-out and success groups, the children from the four groups were combined into one drop-out and one success group. The results of t-test comparisons between these two groups from the 1983 testing are shown in table 79. It can be seen that the drop-outs have average intelligence and were making average progress on English language achievement tests on measures of reading, spelling, and arithmetic. There were no longer any significant differences between the drop-outs and success students on the Tactual Performance Test which would be consistent with the maturational lag hypothesis.

Unfortunately, for the purpose of testing this maturational lag hypothesis, none of the drop-outs opted for a later immersion program. When asked why, two-thirds of the subjects expressed a strong negative opinion of the French immersion program or expressed a lack of confidence in their ability to learn French.

Table 79

T-Test Comparisons Between Drop-Outs and
French Immersion Success Subjects on 1983 Test Variables

Variable	Drop-Outs Mean	Drop-Outs SD	FI Success Mean	FI Success SD	F	p
WPPSI:						
Verbal IQ	100.2	13.1	114.4	10.8	-2.56	.017
Performance IQ	110.4	15.6	118.7	10.2	-1.30	.205
Full scale IQ	105.4	13.1	118.0	10.2	-2.29	.031
WRAT:						
Reading grade score	103.6	2.2	121.3	8.4	-4.33	.000
Spelling grade score	99.4	12.1	114.9	8.9	-3.07	.005
Arithmetic grade score	93.3	7.5	98.3	9.1	-1.42	.168
Peabody:						
A (IQ)	106.1	13.5	130.6	14.5	-4.00	.001
B (IQ)	105.9	14.6	130.4	9.4	-4.10	.000
Tactual Performance Test:						
Time Per Block:						
Dominant hand	.6	.2	.6	.3	.16	.877
Nondominant hand	.4	.2	.4	.1	.42	.680
Both hands	.2	.1	.2	.1	.69	.495
Total	.4	.2	.4	.1	.37	.717
Memory	7.5	1.3	7.7	1.6	-.21	.834
Location	4.8	2.0	6.3	1.6	-1.69	.105
Observer Checklist:						
B = Performance rate	5.6	1.5	7.0	1.3	-2.06	.051
G = Self-confidence	4.2	1.0	6.0	1.7	-3.30	.003

High School Personality Questionnaire: (No significant differences)

DISCUSSION

This report presents the results of seven years of study concerned with the success of children enrolled in primary French immersion programs. The first two years of investigation were concerned with determining the characteristics of children who experience learning difficulties in primary French immersion. The final five years of investigation have focused on the development of a series of tests which can be administered to four-year-old children, prior to their entry into a primary French immersion program, which will be predictive of their long-term success in the immersion program.

The first two years of study into the characteristics of children who experience learning difficulties in primary French immersion began with a detailed comparison of a group of thirty-two French immersion learning-disabled children with other groups of children who experience learning difficulties in school. The latter groups included the more familiar kind of problems such as reading disability, children with emotional problems, and children with evidence of brain dysfunction. Other groups of learning difficulty children, in which language was implicated, included were: immigrant children whose native language was something other than English and who were being educated in an English program; Anglophone children who were attending Francophone schools and who were having difficulty; and Francophone learning difficulty children attending a French language school. The French immersion learning difficulty group stood out from the other seven learning difficulty groups for a number of reasons. They tended to be brighter, come from more advantaged socioeconomic backgrounds, had higher scores on tests of perceptual and language ability, and generally performed at significantly higher levels on tests of physical coordination, strength, and sensory-motor function. However, they performed the poorest of all the groups on a complex psychomotor problem-solving task, the Tactual Performance Test. This measure in neuropsychology can be considered to be a measure of adequacy of temporal lobe functioning. The temporal lobes are brain structures important in memory and language function.

Follow-up studies of the drop-outs from primary French immersion indicated that their performance after age nine or ten reached normal limits on the Tactual Performance Test. Hence, the poor Tactual Performance Test results of the early drop-outs from primary French immersion was considered suggestive of a mild maturational lag in the temporal lobe regions of the brain.

In view of the fact that the eight groups in the first study were clinic referral cases, it was considered important to replicate the findings on a non-clinic referral group. In the second year of study, 16 drop-outs for academic reasons from the French immersion program were matched with 16 success children for age, sex and having had the same French immersion Kindergarten teacher. Once again, the drop-outs were reliably differentiated from the success children. The drop-out group performed significantly more poorly on the Tactual Performance Tests than the success group below age nine but there were no significant differences in the older children on this measure. Thus the first two years of investigation demonstrated that there were reliable differences between success and drop-out children on a variety of neuropsychological, academic achievement and other measures. In addition, the early research indicated that the types of learning disability in French immersion was unique when compared with the pattern of deficits seen in more traditional types of learning difficulties such as reading disability or learning difficulty in children with "minimal brain dysfunction". These results raised the possibility that an early identification assessment could be developed which, when given to four-year-old children, would allow accurate predictions of their future performance in a primary French immersion program prior to their entry into such a program.

An early identification study was begun in the Ottawa schools in the 1976-77 academic year and several of the children in that study were followed through Grade five. The findings are presented in this report. At the outset, extensive family and background factors along with classroom information was obtained on over 1300 children attending English four-year-old Kindergarten in the Ottawa Board of Education. The parents of approximately 450 of the children indicated they intended to enrol their child in primary French immersion beginning in 5-year-old Kindergarten. A random 200 of these children were selected for long-term study.

There were several differences between the children scheduled to enter primary French immersion compared to those scheduled to attend English five-year-old Kindergarten. The children who were to enter French immersion Kindergarten were from higher socioeconomic levels, tended to have parents who either knew or were planning to learn French, had more books in their home and were read to frequently by their parents, and were described by their teachers as more able, mature and motivated to learn. Psychological assessments of these children at the end of four-year-old Kindergarten indicated they were an able group with intelligence in the bright-normal range, excellent vocabulary skills in English and advanced academic readiness in areas such as reading, spelling, and arithmetic. The children were

tested at the end of five-year-old French immersion Kindergarten (1978), end of Grade one (1979), Grade four (1982), and Grade five (1983). There was an attrition from the study. However, it was possible to reassess 60% of the children throughout the full seven years of the prospective early identification program. The children who dropped out of the program because of learning difficulties were followed as well as the children who remained in the program and progressed well. Some children began dropping out of the program in five-year-old Kindergarten and Grade one. They were examined very carefully before determining whether the reasons for dropping out were primarily academic or were due to other factors such as parent dissatisfaction with bussing, or dissatisfaction with resources in the French Immersion program. In spite of the French immersion group being of bright-normal intelligence, accelerated in their early development, and highly motivated to learn, 34 dropped out for well-described academic problems and 80 of the original 200 remained in the French immersion program through the duration of the study.

By very conservative calculations, 20% of the sample dropped out of the immersion program for learning difficulties and a further 20% remained in the program in spite of persisting low achievement levels. Careful examination of the school records plus our own test data indicate that three-fourths of all drop-outs were doing poorly on academic achievement tests in Kindergarten and Grade one.

Teacher predictions at the end of four-year-old Kindergarten and five-year-old Kindergarten were poor indicators of eventual outcome in the French immersion program. Although teacher predictions of success tended to be fairly frequent amongst children who did well in the program, many children who eventually dropped out of French immersion for academic problems were rated by their four-year-old and five-year-old Kindergarten teachers as good candidates for the program. Thus, the high rate of false positive predictions tended to greatly lower the overall accuracy of teacher predictions. Drop-outs tended to occur somewhat more frequently among boys, among children of comparatively lower socioeconomic level (but still, in this sample, from among advantaged social backgrounds), tended to have less nursery school experience, fewer books in the home, and come from lower IQ groups (but usually from average or higher intelligence).

The four-year-old early identification battery was highly accurate in predicting success in the French immersion program. In terms of progress in the program through Grade five, the four-year-old battery correctly classified 85% of the children as to whether they would remain in French immersion or drop out for academic reasons. To further differentiate the groups, it was possible to classify with 80% accuracy the drop-outs from those children who would remain in the program but do poorly and those who would remain in French immersion and be high achievers. The five-year-old Kindergarten test battery had an even higher predictive accuracy. In keeping with the maturational lag model, the Tactual Performance Test was a significant predictor of success or failure in five-year-old immersion Kindergarten and Grade one but in the Grade four and five assessments this measure was no longer among the highly significant predictors. The predictor variables for the older age group included measures of verbal and nonverbal problem-solving ability, verbal fluency, visual perceptual discrimination, and concept formation ability.

It is important to recognize that children who drop out of French immersion for learning difficulties do well when they are enrolled in an English language program. Less than half of the children who made this switch repeated a grade. For those who did repeat a grade, it was for one grade only and seemed to be due to the fact that by being in the immersion program for Kindergarten and perhaps longer, they had missed out on work in the English language curriculum and thus required a catch-up period. Long-term follow-up of the French immersion drop-outs indicated that they did well in the English program and continued to accelerate in the development of English language achievement skills for a number of years following their enrolment in the English program. They in fact made significantly greater gains in the development of English academic achievement skills when compared with the development of English language achievement skills of children enrolled in the French immersion program. This clearly indicates that their learning difficulties were specific to the second language program and were not indicative of a generalized learning difficulty.

Personality testing combined with parent and teacher ratings of the children's behaviour failed to reveal any evidence of detrimental effects of dropping out of primary French immersion programs as a result of learning difficulties. However, long-term follow-up revealed a mildly negative self-concept amongst the drop-out group in spite of having done well for several years in the English language program. This fact, combined with a specific dislike for French and frequent negative opinions of French immersion programs, seems to account for the fact that none of the drop-outs in the groups followed opted for a late immersion program. This is unfortunate since if the maturational lag hypothesis is correct these children would progress normally if enrolled in a late immersion program.

The conservative estimate of a 20% drop out from French immersion for learning difficulties combined with a similar percent of children who remain in the program in spite of doing poorly academically, even among a select group of children such as we followed in this study, argues strongly for an early identification assessment prior to the children entering an early immersion program. The importance of early identification of these problems is even clearer when the long-term negative feelings and attitudes in these children towards French immersion programs is considered. A further benefit from an early identification assessment at the four-year-old Kindergarten level would be that children of average and below average intelligence who have the maturational readiness for an early immersion program would more likely be offered entry in this program than is now the case. Using more informal criteria, such as teacher recommendations, only those children of above-average intelligence and considered by their teachers to be highly mature and motivated are likely to be recommended for the program. These informal criteria are not accurate and some children capable of benefiting from the program are in fact not entering. Therefore, proper early identification assessment would identify those children who do not have the readiness for early French immersion but at the same time would identify those children at all ability levels who would progress in a French immersion program at a level commensurate with their general abilities.

It must be stressed that although the results of this early identification project are encouraging and indicate that progress in French immersion can be predicted with a high degree of accuracy, this assessment battery should be cross-validated with other groups. It is not known, for example, whether the test scores in this battery will be equally accurate in predicting success in the 50-50 bilingual program or with groups of children of lower general abilities levels, or of lower socioeconomic levels than those included in this study.

BIBLIOGRAPHY

Alexander, D.; Hallows, S.; and Tiltens, M. An Investigation of Factors Which May have Contributed to Children Dropping Out of French Immersion at Rosyln School. Unpublished paper completed under the direction of R.C. Tucker for Rosyln School Committee and Sir George Williams University, Montreal, 1974.

Attwell, A. A.; Orpet, R. E.; and Meyers, C. E. "Kindergarten Behaviour Ratings As a Predictor of Academic Achievement". Journal of School Psychology, 6 (1967), pp. 43-46.

Barik, H. C. French Comprehension Test, Level One. Toronto, Ontario: Ontario Institute for Studies in Education, 1976.

Barik, H. C., and Swain, M. "Early Grade French Immersion Classes in a Unilingual English Canadian Setting: The Toronto Study". Scientia Paedogogia Experimentalis 12 (1975b), pp. 153-177.

_____. "English-French Bilingual Education In the Early Grades: The Elgin Study". Modern Language Journal 58 (1974), pp. 392-402.

_____. "Primary-grade French Immersion in a Unilingual English-Canadian Setting: The Toronto Study through Grade 2". Canadian Journal of Education, no.1 (1976a), pp. 39-58.

_____. "Three-year Evaluation of a Large Scale Early French Immersion Program; The Ottawa Study". Language Learning 25 (1975a), pp. 1-30.

_____. "Update to French Immersion: The Toronto Study through Grade 3". Canadian Journal of Education no.4 (1976b), pp. 33-42.

Barkman, L. B. "Some Psychological Perspectives on Bilingualism and Second Language Teaching". McGill Journal of Education 4 (1969), pp. 45-58.

Bramwell, E. "A Remarkable Case of Aphasia". Brain 21 (1898), pp. 343-371.

Bruck, M. "The Suitability of Early French Immersion Programs for the Language Disabled Child". Canadian Journal of Education 1 (1978), pp. 51-72.

Bruck, M.; Lambert, W. E.; and Tucker, G. R. "Bilingual Schooling Through the Elementary Grades: The St. Lambert Project at Grade Seven". Language Learning 24 (1974), pp. 183-203.

____. "Cognitive and Attitudinal Consequences of Bilingual Schooling: The St. Lambert Project through Grade 6". International Journal of Psycholinguistic Research 5-6 (1976), p. 13.

Bruck, M.; Rabinovitch, M. S.; and Oates, M. "The Effects of French Immersion Programs on Children with Language Disabilities : A Preliminary Report". Working Papers on Bilingualism no.5 (1975), pp. 47-86.

Burstall, C.; Jamieson, M.; Cohen, S.; and Hargreaves, M. Primary French in the Balance. Windsor, England: National Foundation for Educational Research, 1974.

Carroll, J. B. "Psychological and Educational Research into Second Language Teaching to Young Children". In Languages and the Young School Child, edited by H. H. Stern, pp. 56-58. London: Oxford University Press, 1969.

Catford, J. D. "Learning a Language in the Field: Problems of Linguistic Relativity". In Toward A Cognitive Approach to School Language Acquisition, edited by R. C. Lugton and C. H. Heinle, pp. 81-97. Philadelphia: Center for Curriculum Development, 1971.

CIRCUS. An Assessment Program for Pre-primary Children. Princeton, New Jersey: Educational Testing Service, 1974.

Cohen, A.; Fathman, A.; and Merino, M. "The Redwood City Bilingual Education Project, 1971-74: Spanish and English Proficiency, Mathematics and Language Use Over Time". Working Papers on Bilingualism no.8 (1976), pp. 1-29.

Connors, C. K. "A Teacher Rating Scale for Use in Drug Studies with Children". American Journal of Psychiatry 126 (1969), pp. 152-156.

Cowan, J. R., and Sarmed, Z. "Reading Performance of Bilingual Children According to Type of School and Home Language". Working Papers on Bilingualism no.11 (1976), pp. 74-114.

Cziko, G. A. "The Effects of Language Sequencing on the Development of Bilingual Reading Skills". Canadian Modern Language Review 32 (1976), pp. 534-539.

Diamond, S. The Double Brain London, England: Churchill Livingstone, 1972.

Dockrell, W. B., and Brosseau, J. F. "The Correlates of Second Language by Young Children". Alberta Journal of Educational Research 13 (1967), pp. 295-298.

Downing, J. Bilingualism and Learning to Read: A Cross-Cultural Approach. Unpublished paper. Victoria, British Columbia: University of Victoria, undated.

Dunn, L. Peabody Picture Vocabulary Test (expanded manual). Circle Pines, Minnesota: American Guidance Service, 1965.

Edwards, H. P., and Casserly, M. C. Evaluation of Second Language Programs in the English Schools. Annual Report, 1972-73. Ottawa, Ontario: The Ottawa Roman Catholic Separate School Board, 1973.

____. Research and Evaluation of Second Language (French) Programs. Toronto, Ontario: Ministry of Education, Ontario, 1976.

____. Research and Evaluation of Second Language Programs: 1971-72 Annual Report. Ottawa, Ontario: The Ottawa Roman Catholic Separate School Board, 1972.

____. Research and Evaluation of the French Program 1970-71 Annual Report. Ottawa, Ontario: The Ottawa Roman Catholic Separate School Board, 1971.

Edwards, H. P., and Smyth, F. Evaluation of Second Language Programs and Some Alternatives for Teaching French as a Second Language in Grades Five to Eight. Toronto, Ontario: Ministry of Education, Ontario, 1976.

Engle, P. L. The Use of Vernacular Languages in Education. Arlington, Virginia: Centre for Applied Linguistics, 1975.

Fox, B., and Routh, D. "Analyzing Spoken Language into Words, Syllables and Phonemes: A Developmental Study". Journal of Psycholinguistic Research 4 (1975), pp. 331-342.

Gardner, R. C., and Lambert, W. E. "Motivational Variables in Second Language Acquisition". Canadian Journal of Psychology 13 (1959), pp. 226-272.

Gardner, R. C., and Smythe, P. C. The Integrative Motive in Second Language Acquisition. Research Bulletin no.275. London, Ontario: University of Western Ontario, 1973.

Genesee, F. "A Longitudinal Evaluation of an Early Immersion School Program". Canadian Journal of Education no.4 (1978), pp. 31-50.

Genesee, F.; Allister, T.; and Morin, S. Evaluation of the 1973-74 Pilot Grade XI French Immersion Class. Report by Curriculum Department. Montreal, Quebec: Protestant School Board of Greater Montreal, 1974.

Gezi, K. "Bilingual-Bicultural Education: A Review of Relevant Research". California Journal of Educational Research 35 (1974), pp. 223-239.

Harris, A. J. "Lateral Dominance, Directional Confusion and Reading Disability". Journal of Psychology 44 (1957), pp. 283-294.

H.S.P.Q. Manual for the High School Personality Questionnaire. Champaign, Illinois: Institute for Personality and Ability Testing, 1968.

Hull, C. H. and Nie, N. H. SPSS Update 7-9, New Procedures and Facilities for Releases 7-9. New York: McGraw-Hill, 1981.

Jastak, J. F., and Jastak, S. R. The Wide Range Achievement Test. Manual of Instructions. Wilmington, Delaware: Guidance Associates, 1965.

Jones, W. R. Bilingualism in Welsh Education. Cardiff, Wales: University of Wales Press, 1966.

Kimura, D. "Some Effects of Temporal-lobe Damage on Auditory Perception". Canadian Journal of Psychology 15 (1961), pp. 156-165.

Krashen, S. D. "The Development of Cerebral Dominance and Language Learning: More New Evidence". In Developmental Psycholinguistics: Theory and Application, edited by D. P. Dato, pp. 179-192. Washington, D.C.: Georgetown University Round Table on Language and Linguistics, 1975.

____. "Lateralization, Language Learning and the Critical Period: Some New Evidence". Language Learning 23 (1973), pp. 63-74.

Lambert, W. E. "Culture and Language as Factors in Learning and Education". Presented at 5th Annual Learning Symposium on Cultural Factors in Learning, Washington, D.C., November 1973; and TESOL Meeting, Denver, March, 1974.

Lambert, W. E., and Tucker, G. R. Bilingual Education of Children: The St. Lambert Experiment. Rowley, Massachusetts: Newbury House, 1972.

Lambert, W. E.; Tucker, G. R.; and D'Anglejan, A. "Cognitive and Attitudinal Consequences of Bilingual Schooling: The St. Lambert Project Through Grade Five". Journal of Educational Psychology 65 (1973), pp. 141-159.

Lennenberg, E. Biological Foundations of Language. New York: Wiley and Sons, 1967.

Mackey, W. F. "The Lesson to be Learned from Bilingualism". In Applied Linguistics and the Teaching of French, edited by P. R. Leon, pp. 53-62. Montreal, Quebec: Centre Educatif et Culturel, 1967.

Macnamara, J. Bilingualism in Primary Education: A Study of Irish Experience. Edinburgh: University Press, 1966.

____. "Comparisons between First and Second Language Learning". Working Papers on Bilingualism no.7 (1975), pp. 71-95.

McDougall, A., and Bruck, M. "English Reading Within the French Immersion Program: A Comparison of the Effects of the Introduction of English Reading at Different Grade Levels". Language Learning no.1 (1976), pp. 37-43.

McLaughlin, B. "Second Language Learning in Children". Psychological Bulletin no.3 (1972), p. 438.

Miller, G. A., ed. Linguistic Communication: Perspectives for Research. Newark, Delaware: International Reading Association, 1973.

Milner, B. "Intellectual Function of the Temporal Lobes". Psychological Bulletin 51 (1954), pp. 42-61.

____. "Psychological Defects Produced by Temporal Lobe Excision." Proceedings of the Association for Research in Nervous and Mental Disease. In The Brain and Human Behaviour, pp. 244-257. Baltimore, Maryland: Williams and Wilkins, 1958.

Modiano, N. "National or Mother Language in Beginning Reading: A Comparative Study". Research in the Teaching of English 2 (1968), pp. 32-43.

Molfese, D. "Cerebral Asymmetry in Infants, Children and Adults: Auditory Evoked Responses to Speech and Noise Stimuli". Dissertation Abstracts International 34 (1974) (3-13), 1298.

Myklebust, H. R. The Pupil Behavior Rating Scale. New York: Grune and Stratton, 1971.

Nie, N. H.; Hull, C. H.; Jenkins, J.; Steinbrenner, R; and Bent, D. H. Statistical Package for the Social Sciences SPSS). 2nd ed. New York: McGraw-Hill, 1975.

Ortiz, A. "Special Education in Bi-Lingual/Bi-Cultural Communities". Paper presented at the Sixth International Congress of the International Association for the Scientific Study of Mental Deficiency, Toronto, August, 1982.

Paulston, C. B. "Ethnic Relations and Bilingual Education: Accounting for Contradictory Data". Working Papers on Bilingualism no.6 (1975), pp. 1-44.

Penfield, W. "Conditioning of the Uncommitted Cortex for Language Learning". Brain 88 (1965), pp. 787-798.

____. "A Consideration of the Neurophysiological Mechanisms of Speech and Some Educational Consequences". Proceedings of the American Academy of Arts and Sciences no.5 (1953), pp. 201-214.

Pimsleur, R.; Stockwell, R. P.; and Comrey, A. L. "Foreign Language Learning Ability." Journal of Educational Psychology 53 (1962), pp. 15-26.

Porter, R. B. and Cattell, R. B. Manual for the Children's Personality Questionnaire Champaign, Illinois: Institute for Personality and Ability Testing, 1968.

Raven, J. C. The Colored Progressive Matrices. London, England: H. K. Lewis and Company, Ltd., 1965.

Renfrew, C. E. Action Picture Test Manual. Oxford, England: The Churchill Hospital, 1971.

Rosansky, E. J. "The Critical Period for the Acquisition of Language: Some Cognitive Developmental Considerations". Working Papers on Bilingualism no.6 (1975), pp. 92-102.

Schumann, J. H. "Affective Factors and the Problem of Age in Second Language Acquisition". Language Learning no.2 (1975), pp. 209-235.

Smythe, P. E.; Stennet, R. G., and Gardner, R. C. "Children and Adults as Foreign Language Students". Canadian Modern Language Review 32 (1976), pp. 10-21.

Stern, H. H. Foreign Language in Primary Education. London, England: Oxford University Press, 1967.

Swain, M. Early and Late French Immersion Programs in Canada: Findings. Presented at the Federal-Provincial Conference on Bilingualism in Education, Halifax, Nova Scotia, 1974.

Swain, M., and Burnaby, B. "Personality Characteristics and Second Language Learning in Young Children: A Pilot Study". Working Papers on Bilingualism no.11 (1976), pp. 115-128.

Tatsuoka, M. M. Multivariate Analysis. New York: Wiley, 1971.

Tremaine, R. Syntax and Piagetian Operational Thought: A Developmental Study of Bilingual Children. Washington, D.C.: Georgetown University Press, 1975.

Trites, R. L. Neuropsychological Test Manual. Montreal, Quebec: Ronalds Federated, 1977.

Trites, R. L., and Price, M.A. Assessment of Readiness for Primary French Immersion. Toronto, Ontario: Ministry of Education, Ontario, 1978.

____. Assessment of Readiness for Primary French Immersion:Grade One Follow-up Assessment. Toronto, Ontario: Ministry of Education, Ontario, 1980.

____. Assessment of Readiness for Primary French Immersion:Kindergarten Follow-up Assessment. Toronto, Ontario: Ministry of Education, Ontario, 1979.

____. Learning Disabilities Found in Association with French Immersion Programming. Toronto, Ontario: Ministry of Education, Ontario 1976.

Tucker, G. R. "The Development of Reading Skills, Within a Bilingual Education Program". In Language and Reading, edited by S. Smiley and J. Towner, 1975.

Tucker, G. R.; Hamayan, E.; and Genesee, F "Affective, Cognitive and Social Factors in Second Language Acquisition". Canadian Modern Language Review 32 (1976), pp. 214-226.

Tucker, G. F.; Lambert, W. E.; and D'Anglejan, A. Are French Immersion Programs Suitable for Working Class Children? A Pilot Investigation. Unpublished Research Report. Montreal, Quebec: McGill University, 1972.

UNESCO: Report of an International Seminar on Bilingualism in Education, Aberstwyth, Wales. London, England: Her Majesty's Stationary Office, 1975.

Wechsler, D. Manual: Wechsler Intelligence Scale for Children : Revised. New York: Psychological Corporation, 1974.

____. Wechsler Adult Intelligence Scale : Revised. New York: Psychological Corporation, 1981.

____. Wechsler Preschool and Primary Scale of Intelligence. New York: Psychological Corporation, 1963.